THE WESTINGHOUSE AUTOMATIC BRAKE

CATALOGUE

1890.

THE

Westinghouse Air Brake Company,

PITTSBURGH, PA., U. S. A.

OFFICERS.

GEO. WESTINGHOUSE, Jr., President.

JOHN CALDWELL, Treasurer.

H. H. WESTINGHOUSE, General Manager.

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Hanover, 32 Schillerstrasse,
GERMANY.

PITTSBURGH, PA.
1890.

DUQUESNE
PRINTING & PUBLISHING COMPANY,
PITTSBURGH.

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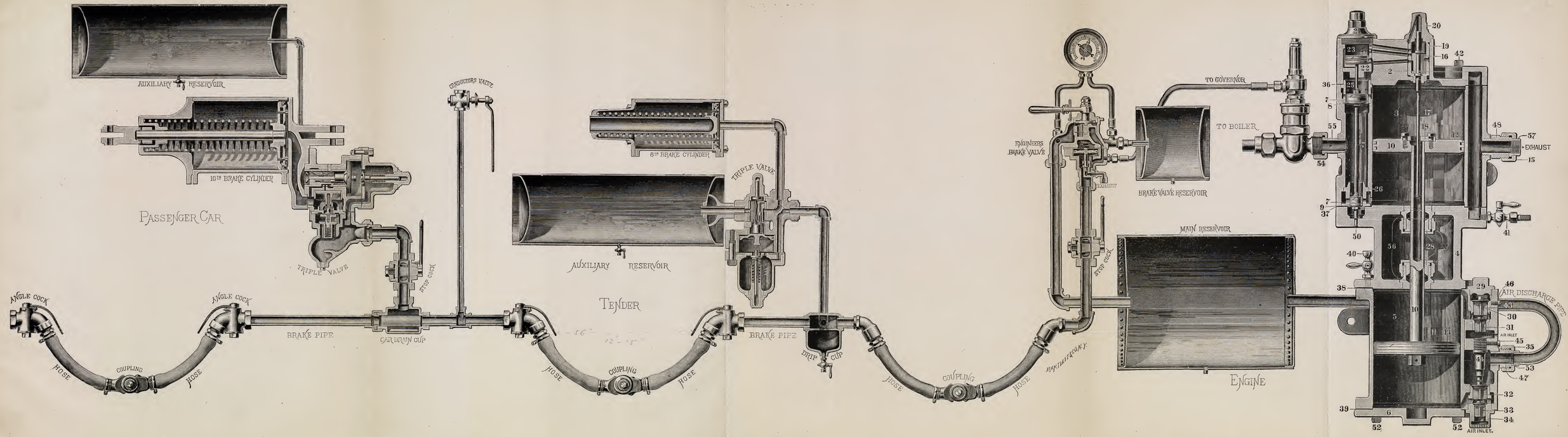
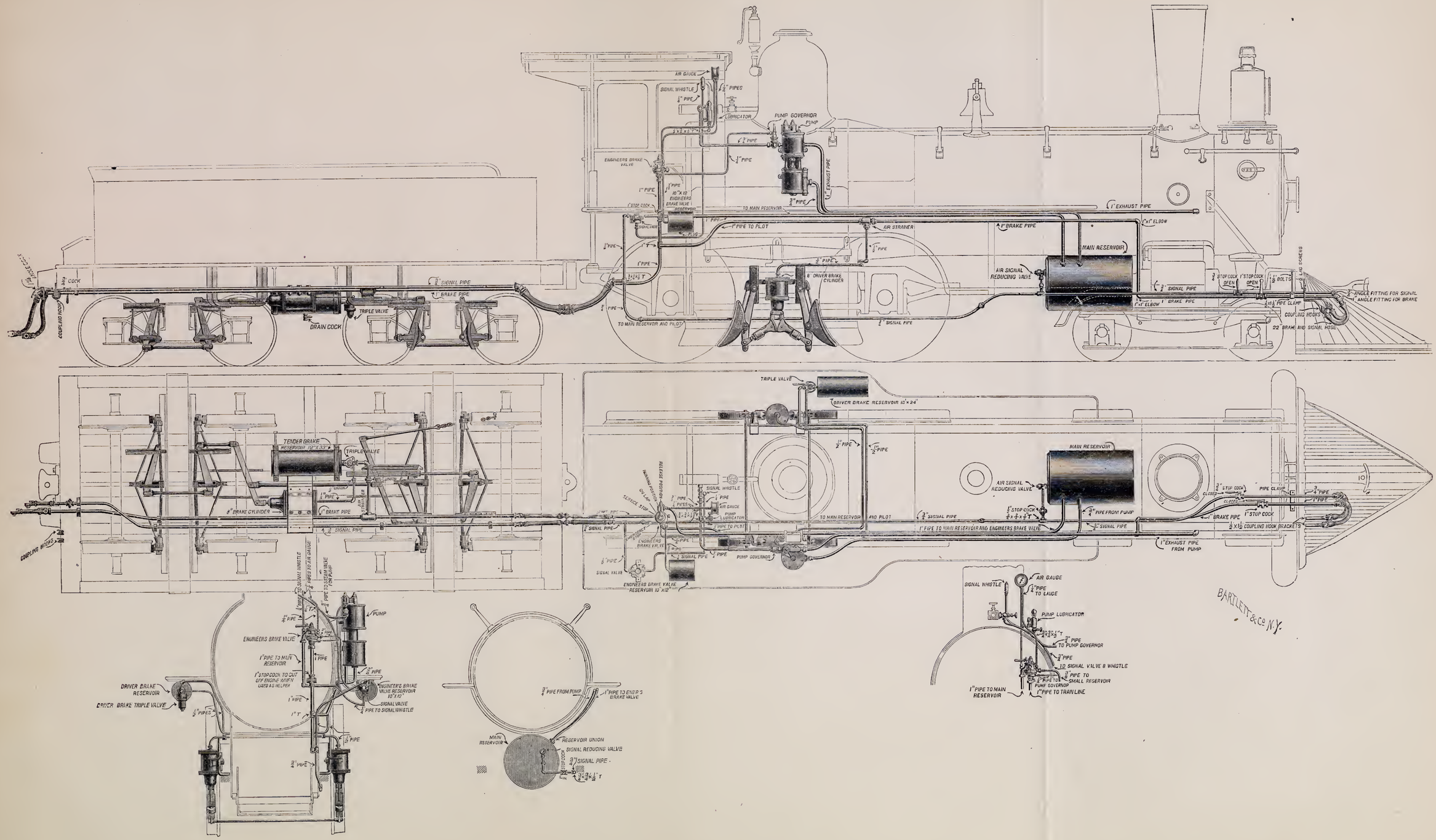
THE WESTINGHOUSE QUICK ACTION AUTOMATIC BRAKE

PLATE D1.



THE WESTINGHOUSE AUTOMATIC BRAKE AS APPLIED TO A LOCOMOTIVE.

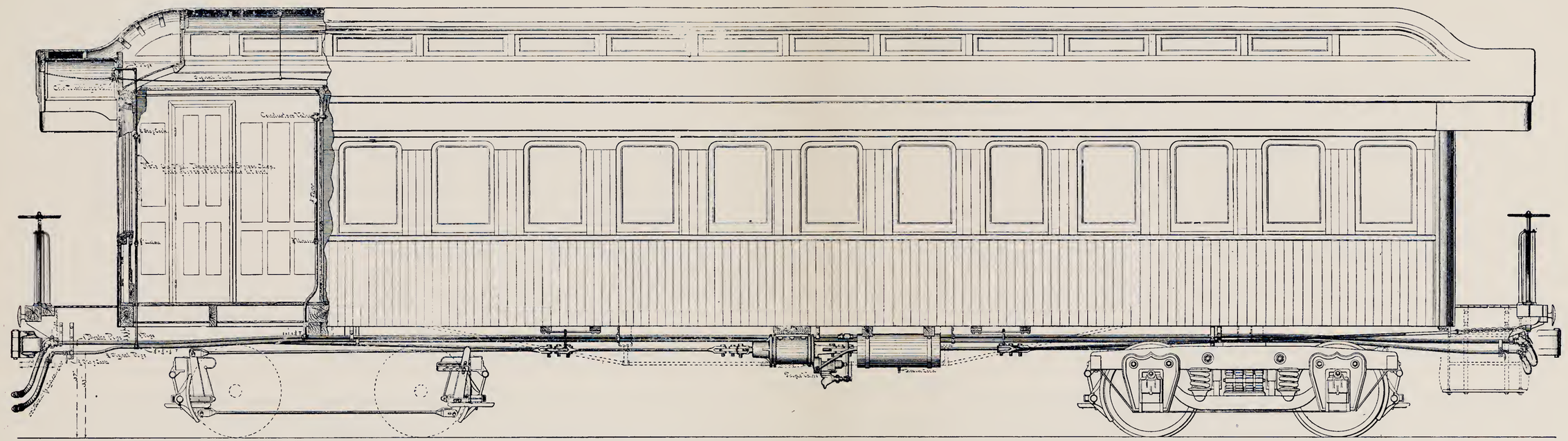
PLATE D2.

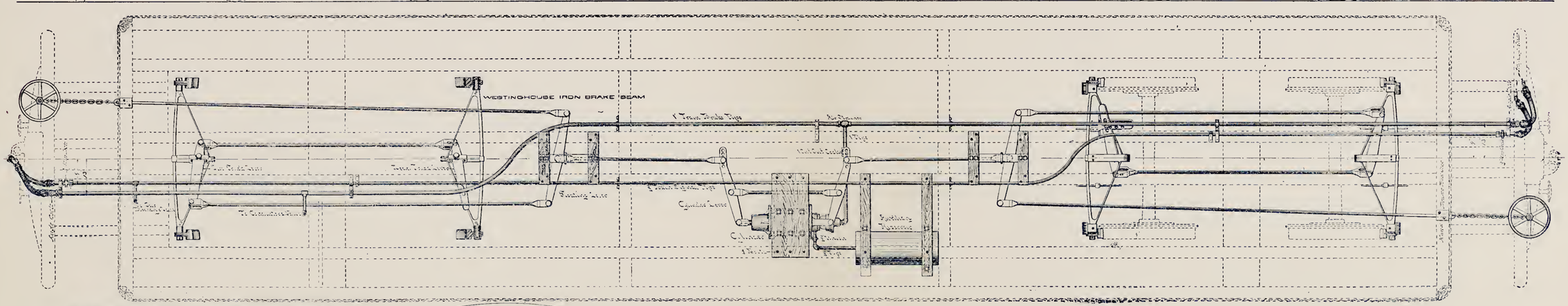


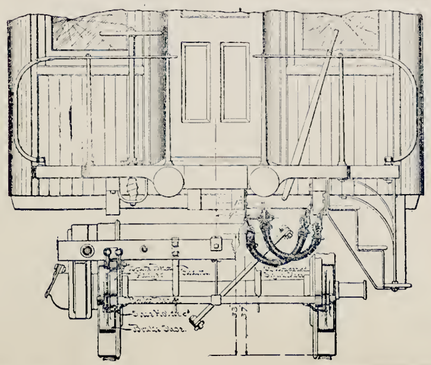
BARTLETT & CO. N.Y.

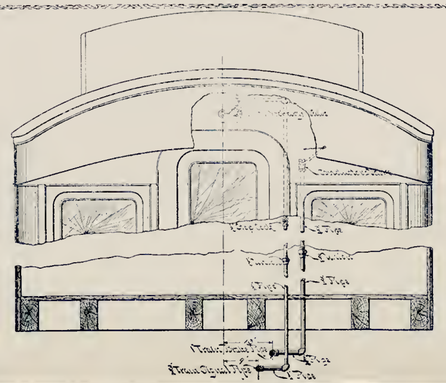
THE WESTINGHOUSE QUICK ACTION AUTOMATIC BRAKE AS APPLIED TO A PASSENGER CAR.

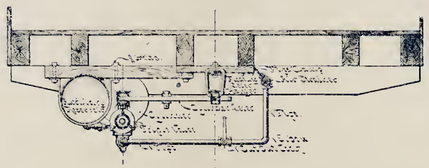
PLATE D3.







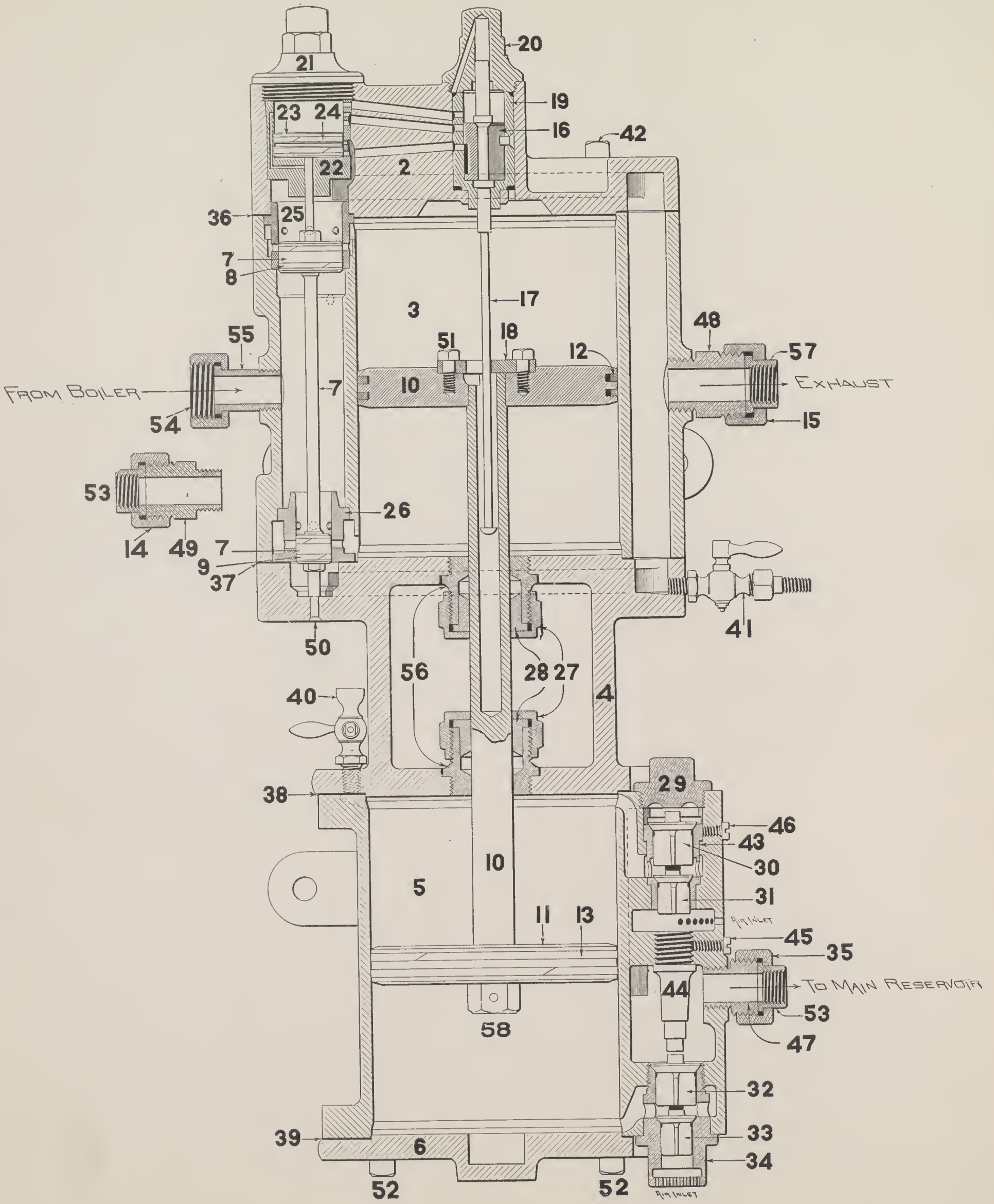




Plugs to be used where gas is used and brass should be used where heating coil is connected to be plugged. Right hand thread should be used on this plug in position marked R and left hand thread to be used in position marked L. Reducing bushing of 1 inch size reducing to 3/4 inch size for connection of pipe that connects into plug. Reducing bushing of 3/4 inch size for connection of pipe that connects into plug. Reducing bushing of 1/2 inch size for connection of pipe that connects into plug. These plugs are intended for pipe, so as to be easy to get into pipe tight when used. Examples with proper bushing of brass

EIGHT-INCH AIR PUMP.

PLATE D6.



EIGHT-INCH AIR PUMP.

PLATE D6.

No. 1. Eight-inch Pump, complete.

DETAILS.

No.

2. Top Head, with Reversing-cylinder, Piston and Valve Bushes.
3. Steam-cylinder, with Main Valve and Bushes.
4. Centre-piece.
5. Air-cylinder Body, with Valves.
6. Air-cylinder Head.
7. Main Valve.
8. Upper Main Valve Packing-ring.
9. Lower Main Valve Packing-ring.
10. Steam Piston and Rod.
11. Air-piston.
12. Steam-piston Packing-ring.
13. Air-piston Packing-ring.
14. Three-fourths in. Steam-pipe Union Nut.
15. One-inch Exhaust-pipe Union Nut.
16. Reversing-valve.
17. Reversing-valve Stem.
18. Reversing-valve Plate.
19. Reversing-valve Bush.
20. Reversing-valve Chamber Cap.
21. Reversing-cylinder Cap.
22. Reversing-cylinder.
23. Reversing-piston.
24. Reversing-piston Packing-ring.
25. Upper Main Valve Bush.
26. Lower Main Valve Bush.
27. Packing Nut.
28. Packing Gland.
29. Upper Valve Chamber Cap.

No.

30. Upper Discharge-valve.
31. Upper Receiving-valve.
32. Lower Discharge-valve.
33. Lower Receiving-valve.
34. Lower-valve Chamber Cap.
35. Three-fourths in. Reservoir Union Nut.
36. Upper Steam-cylinder Gasket.
37. Lower Steam-cylinder Gasket.
38. Upper Air-cylinder Gasket.
39. Lower Air-cylinder Gasket.
40. Air-cylinder Oil-cup.
41. Drain Cock.
42. Cylinder-head Bolt.
43. Valve Chamber Bush.
44. Discharge Valve Stop.
45. Valve Stop Set Screw.
46. Chamber Bush Set Screw.
47. Three-fourths in. Reservoir Union Stud.
48. One in. Exhaust-pipe Union Stud.
49. Three-fourths in. Steam-pipe Union Stud.
50. Main Valve Stop.
51. Reversing-valve Plate Bolt.
52. Pump-head Bolt.
53. Three-fourths in. Union Swivel.
54. Governor Union Nut.
55. Governor Union Stud.
56. Piston Stuffing Box.
57. One inch Union Swivel.

Orders must give number of Plate and of piece wanted.

ENGINEER'S BRAKE AND EQUALIZING DISCHARGE VALVE.

PLATE D8.

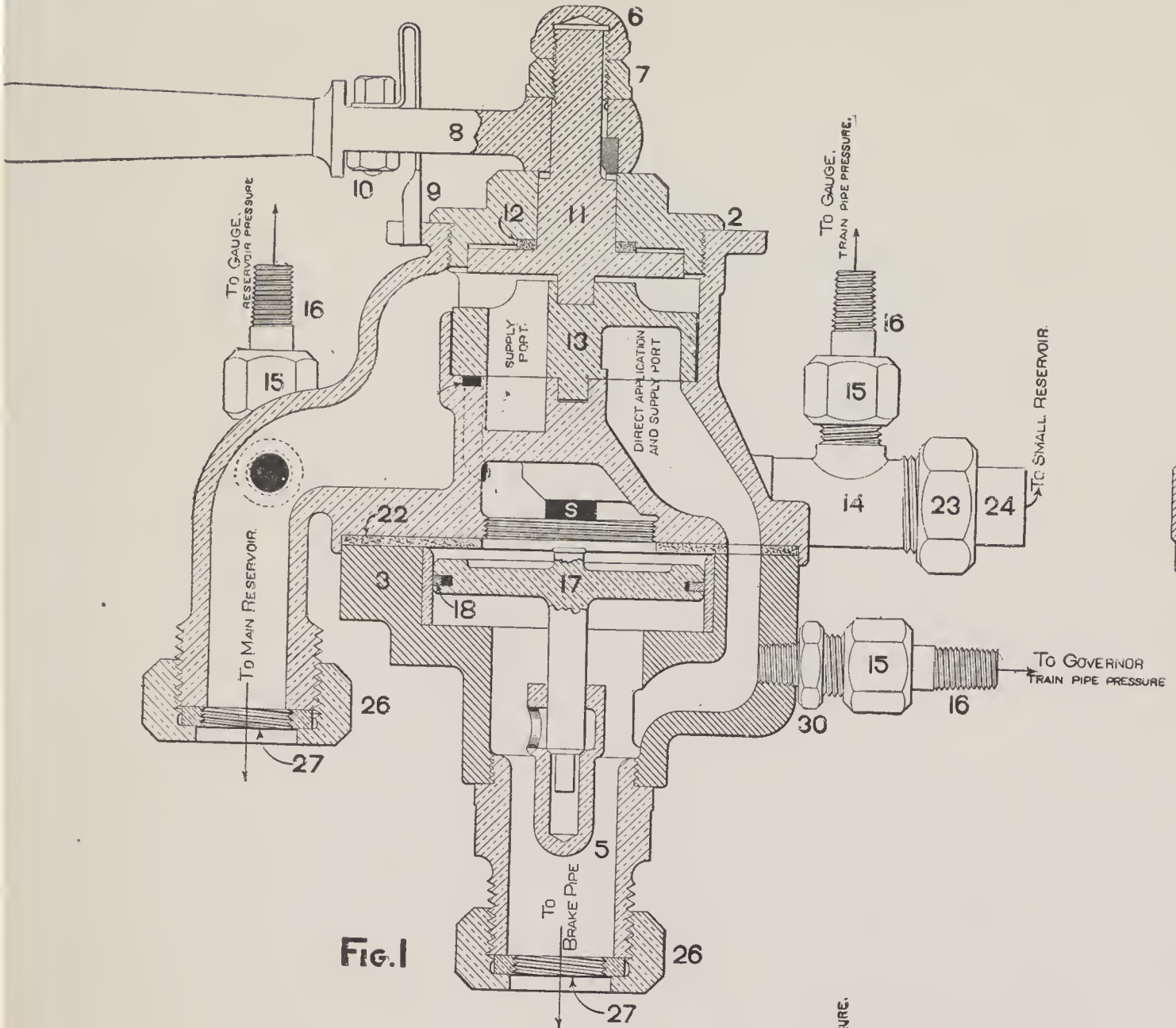


FIG. 1

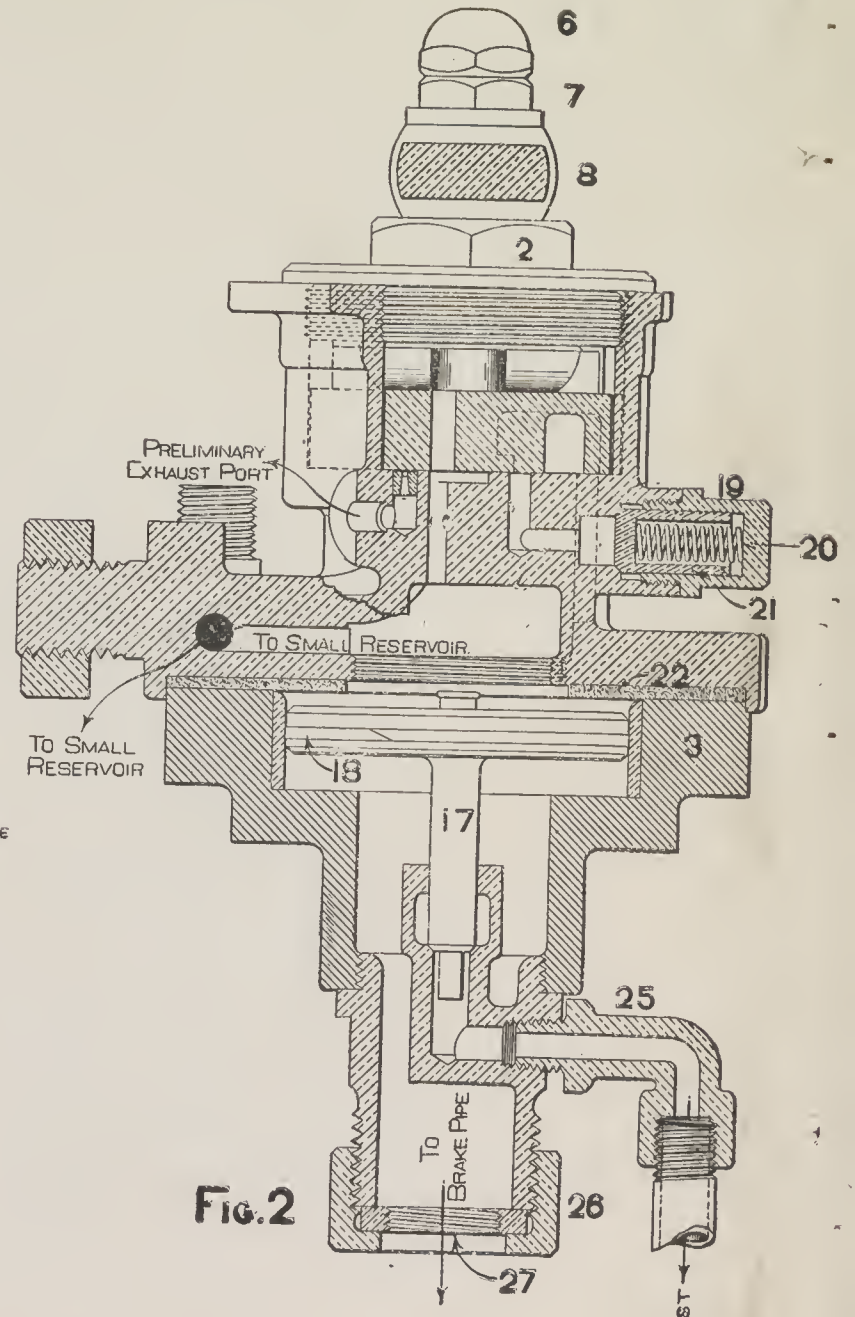


FIG. 2

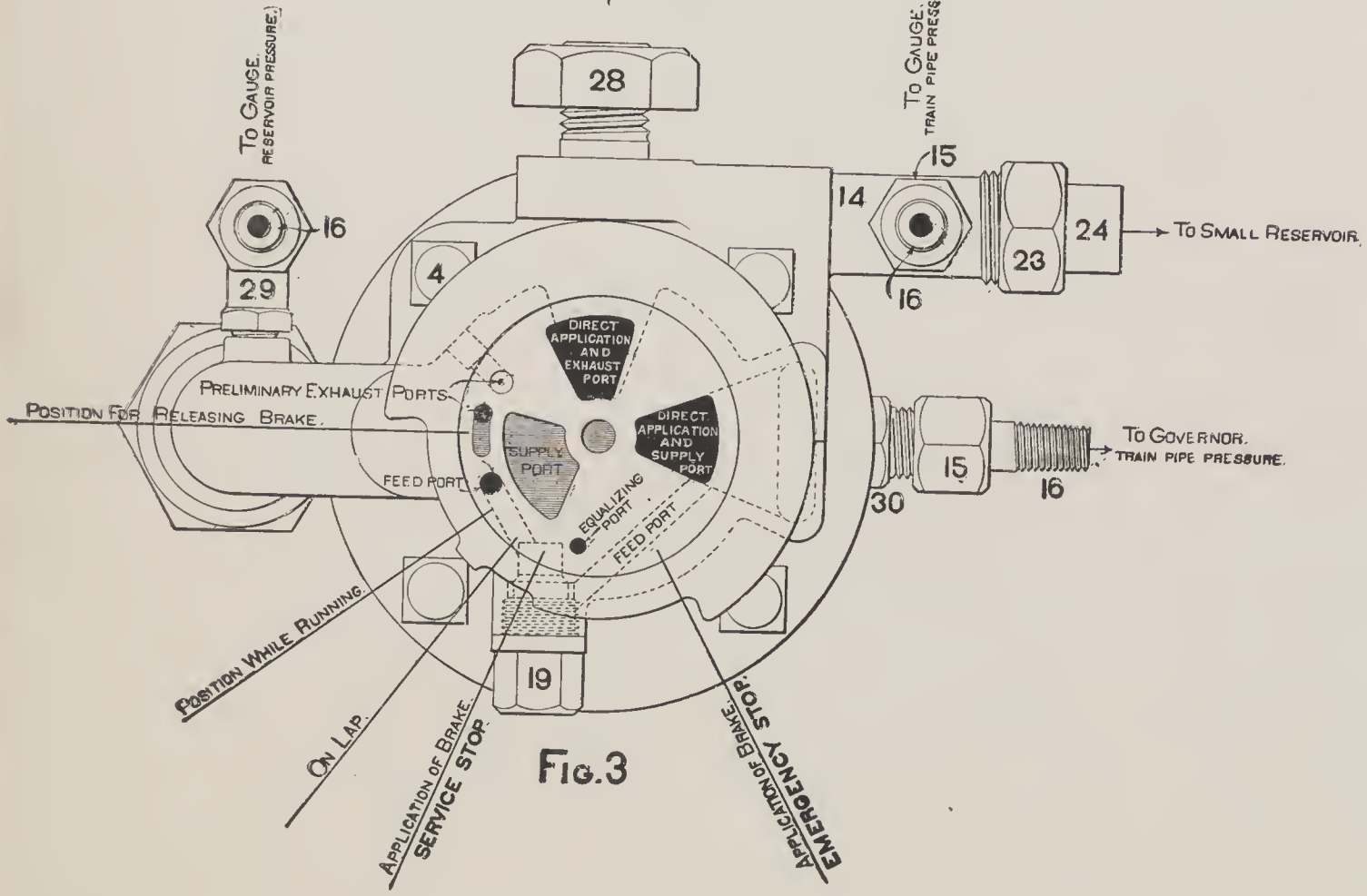


FIG. 3

ENGINEER'S BRAKE AND EQUALIZING DISCHARGE VALVE.

PLATE D8.

With Cut-out Cock and Reservoir, complete.

DETAILS.

No.

1. Valve Body.
2. Top Cap.
3. Bottom Case.
4. Cap Screw.
5. Bottom Cap.
6. Jam Nut.
7. Top Nut.
8. Handle.
9. Handle Spring.
10. Handle-spring Bolt and Nut.
11. Rotary-valve Key.
12. Washer.
13. Rotary Valve.
14. Gauge-pipe Tee.
15. One-fourth inch Union Nut.

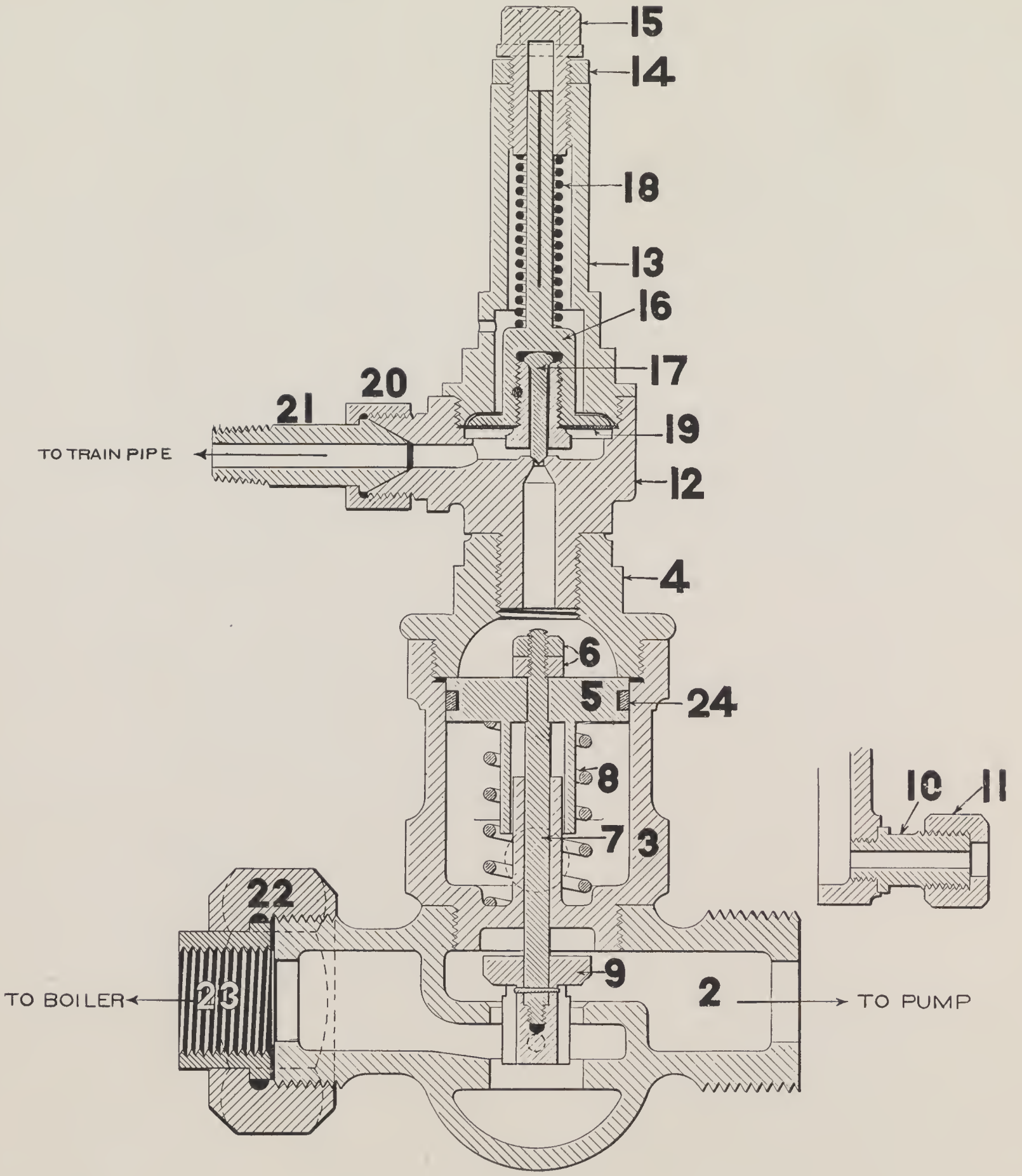
No.

16. One-fourth inch Union Swivel.
17. Piston Valve.
18. Piston Ring.
19. Cap Nut.
20. Feed-valve Spring.
21. Feed Valve.
22. Gasket.
23. Three-eighths inch Union Nut.
24. Three-eighths inch Union Swivel.
25. Exhaust-pipe Fitting.
26. One inch Union Nut.
27. One ineh Union Swivel.
28. Holding Nut.
29. Gauge-pipe Union Fitting.
39. Governor-pipe Union Stud.

Orders must give number of Plate and of piece wanted.

PUMP GOVERNOR

PLATE D9.



PUMP GOVERNOR.

PLATE D9.

No. 1. Pump Governor, complete.

DETAILS.

No.

2. Steam-valve Body.
3. Steam-valve Cylinder.
4. Steam-valve Cylinder Cap.
5. Piston.
6. Piston Nuts.
7. Piston Stem.
8. Piston Spring.
9. Steam Valve.
10. Waste-pipe Stud.
11. Waste-pipe Stud Union Nut.
12. Diaphragm Body.
13. Spring Box.

No.

14. Jam Nut.
15. Spring Box Cap.
16. Diaphragm Stem and Nut.
17. Diaphragm Valve.
18. Regulating Spring.
19. Diaphragm Plate.
20. Union Nut.
21. Union Swivel.
22. Steam-union Nut.
23. Steam-union Swivel.
24. Packing Ring.

Orders must give number of Plate and of piece wanted.

DETAILS OF BRAKE APPARATUS.

PLATE D10.

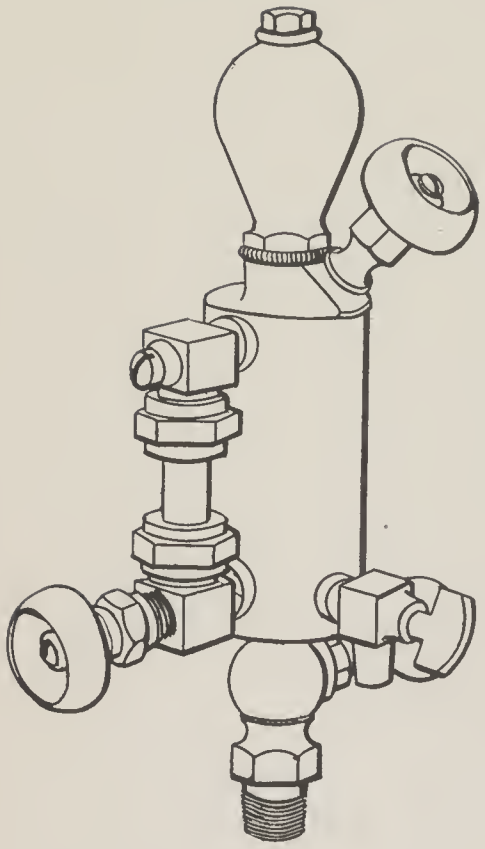


Fig. 1.

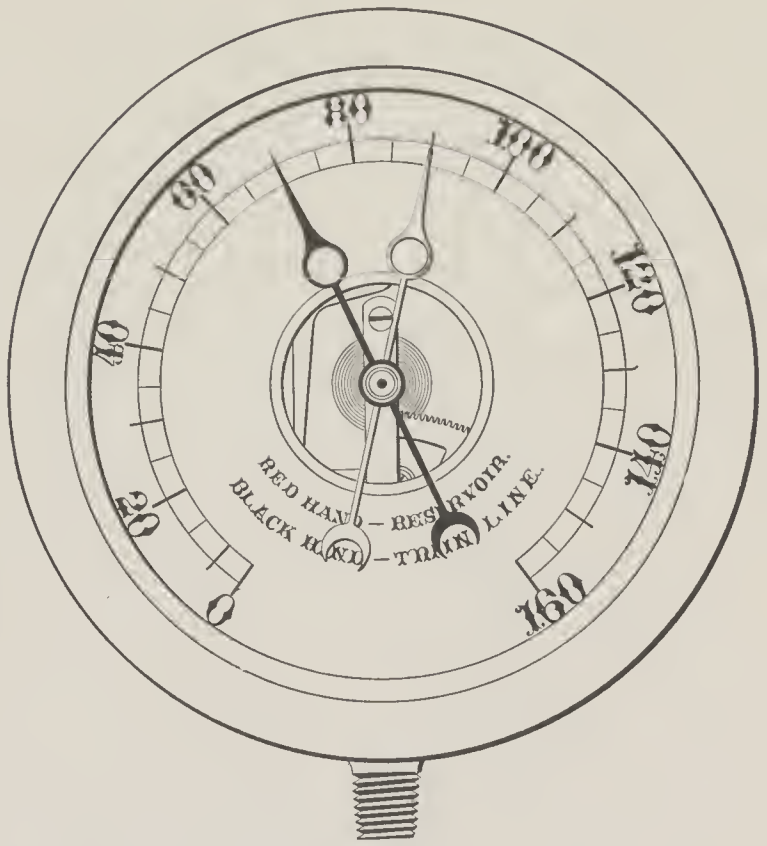


Fig. 2.

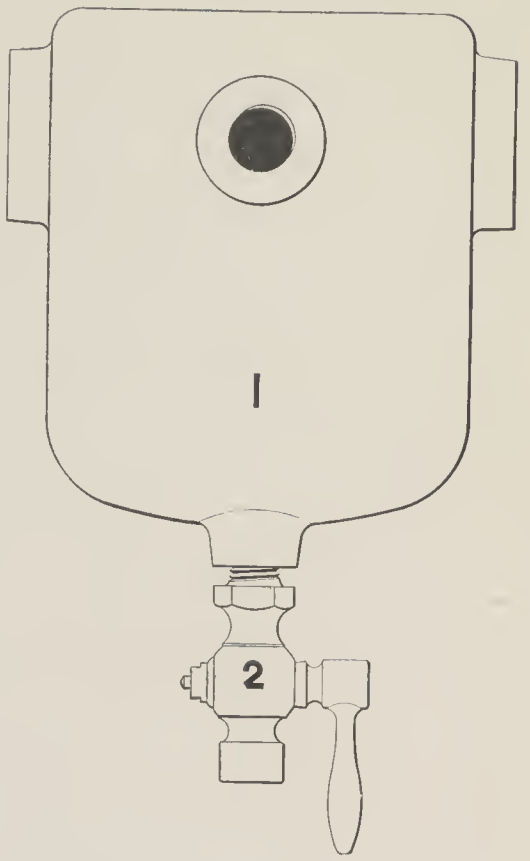


Fig. 6.

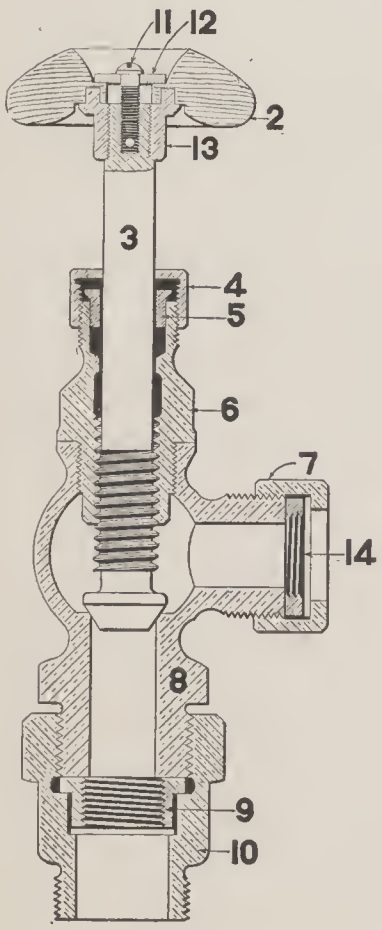


Fig. 3.

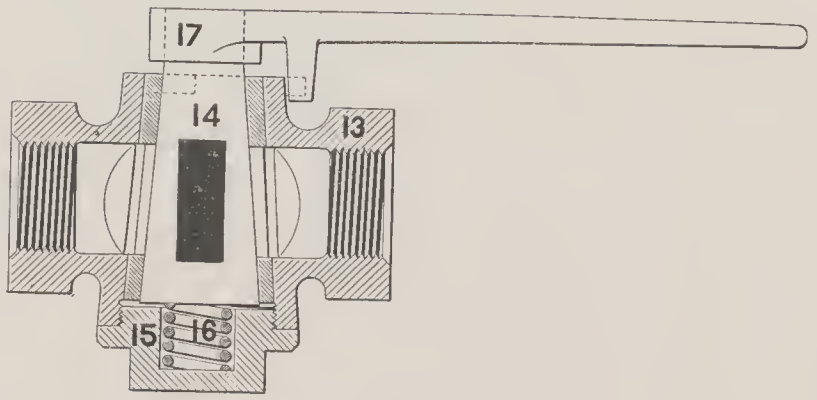


Fig. 4

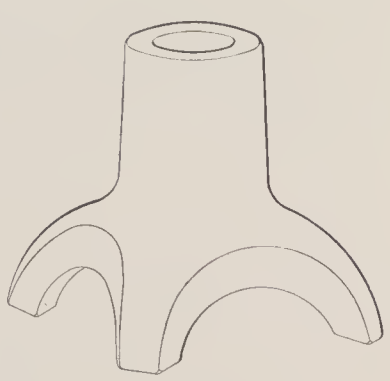


Fig. 5.

Fig. 7.

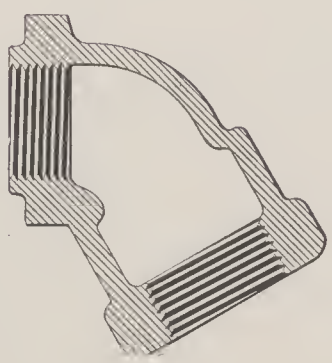


Fig. 8.

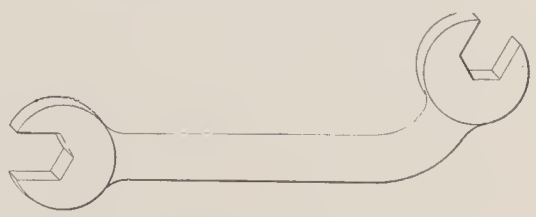


Fig. 11.

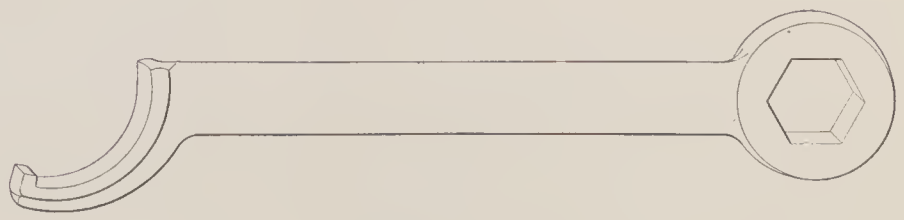
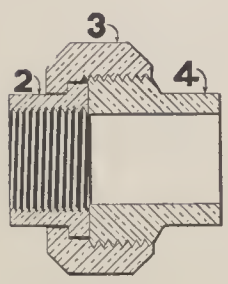
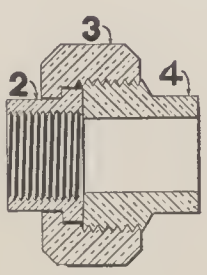


Fig. 12.



1″

Fig. 9.



$\frac{3}{4}$″

Fig. 10.

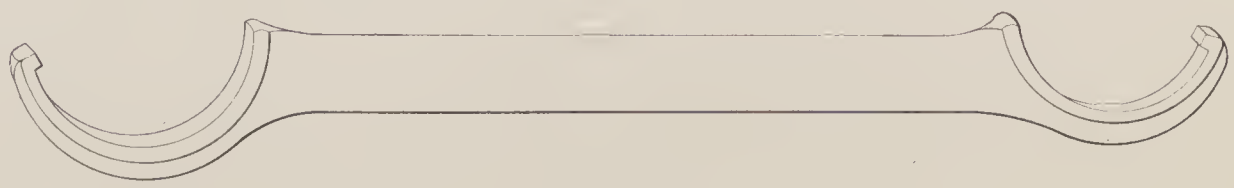


Fig. 13.

DETAILS OF BRAKE APPARATUS.

PLATE D10.

FIG. 1.

Air Pump Lubricator.

FIG. 2.

Duplex Air Gauge.

FIG. 3.

No. 1. Three-fourths inch Steam Valve, complete.

No.	DETAILS.
2.	Hand Wheel.
3.	Valve Stem.
4.	Packing Nut.
5.	Packing Gland.
6.	Neck Piece.
7.	Union Nut.
8.	Valve Body.
9.	Union Swivel.
10.	Valve Stud.
11.	Hand-wheel Screw.
12.	Hand-wheel Washer.
13.	Hand-wheel Socket.
14.	Steam-pipe Swivel Ring.

FIG. 4.

One inch Cut-out Cock, complete.

No.	DETAILS.
13.	Cock Body.
14.	Cock Key.
15.	Cap Nut.
16.	Key Spring.
17.	Handle.

FIG. 5.

Triple Valve Bracket.

FIG. 6.

Tender Drain Cup, complete.

No.	DETAILS.
1.	Tender Drain Cup.
2.	Tender Drain Cock.

FIG. 7.

Triple Valve Nipple.

FIG. 8.

One in. by One and one-fourth in. Angle Fitting.

FIG. 9.

One inch Reservoir Union, complete.

No.	DETAILS.
2.	Union Swivel.
3.	Union Nut.
4.	Union Stud.

FIG. 10.

Three-fourths in. Reservoir Union, complete.

No.	DETAILS.
2.	Union Swivel.
3.	Union Nut.
4.	Union Stud.

FIG. 11.

Pump Bolt Wrench.

FIG. 12.

Cap and Stuffing Box Wrench.

FIG. 13.

Cam Nut Wrench.

Orders must give number of Plate and of piece wanted.

DRIVING WHEEL BRAKE.

PLATE. D11.

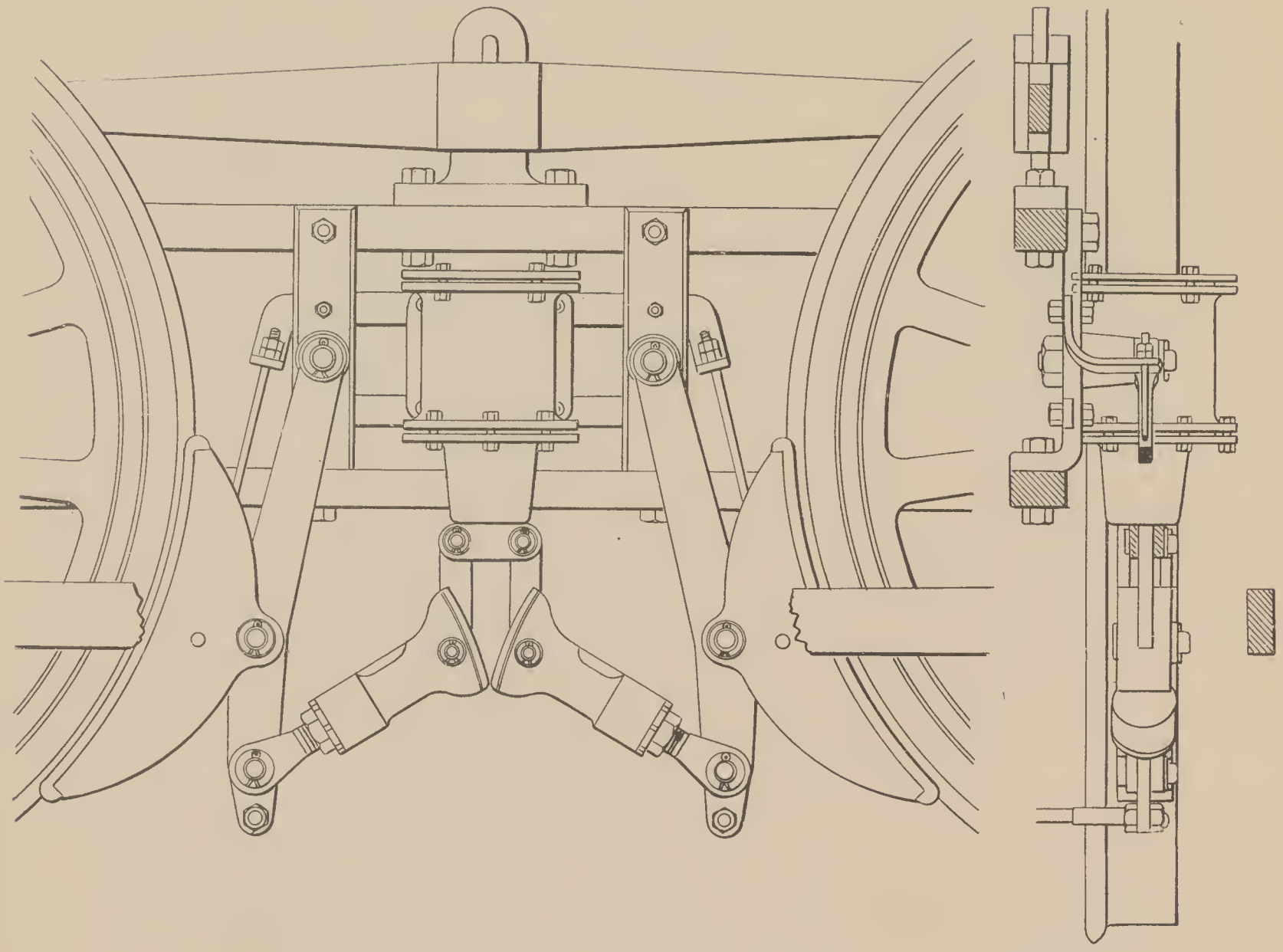
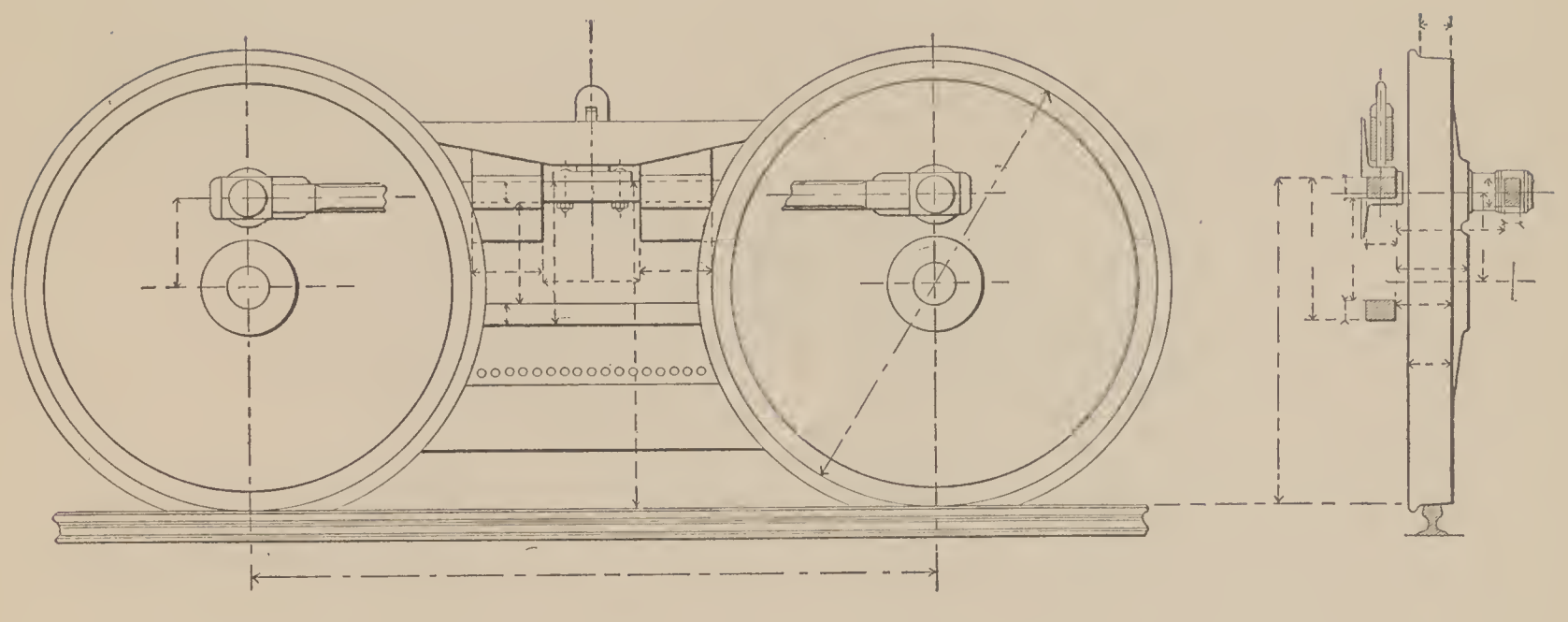


DIAGRAM FOR DESIGNING CAM DRIVER BRAKES.



DIMENSIONS REQUIRED.

Distance between centres of Wheels,
Diameter of Wheels,
Width between Wheels (across Engine),
Width of Tires,
Width between Frames (across Engine),
Width of Frames,
Thickness of Frames,
Distance from centre of Axle to top of Frame,
Distance between top and bottom of Frame,
Position of Bracket for holding Frame to Fire-box,
Dimensions of Bracket for holding Frame to Fire-box,
Position of Side Rods,
Position of Wheel Covers (if any),

Name of Road.

Weight on Drivers.

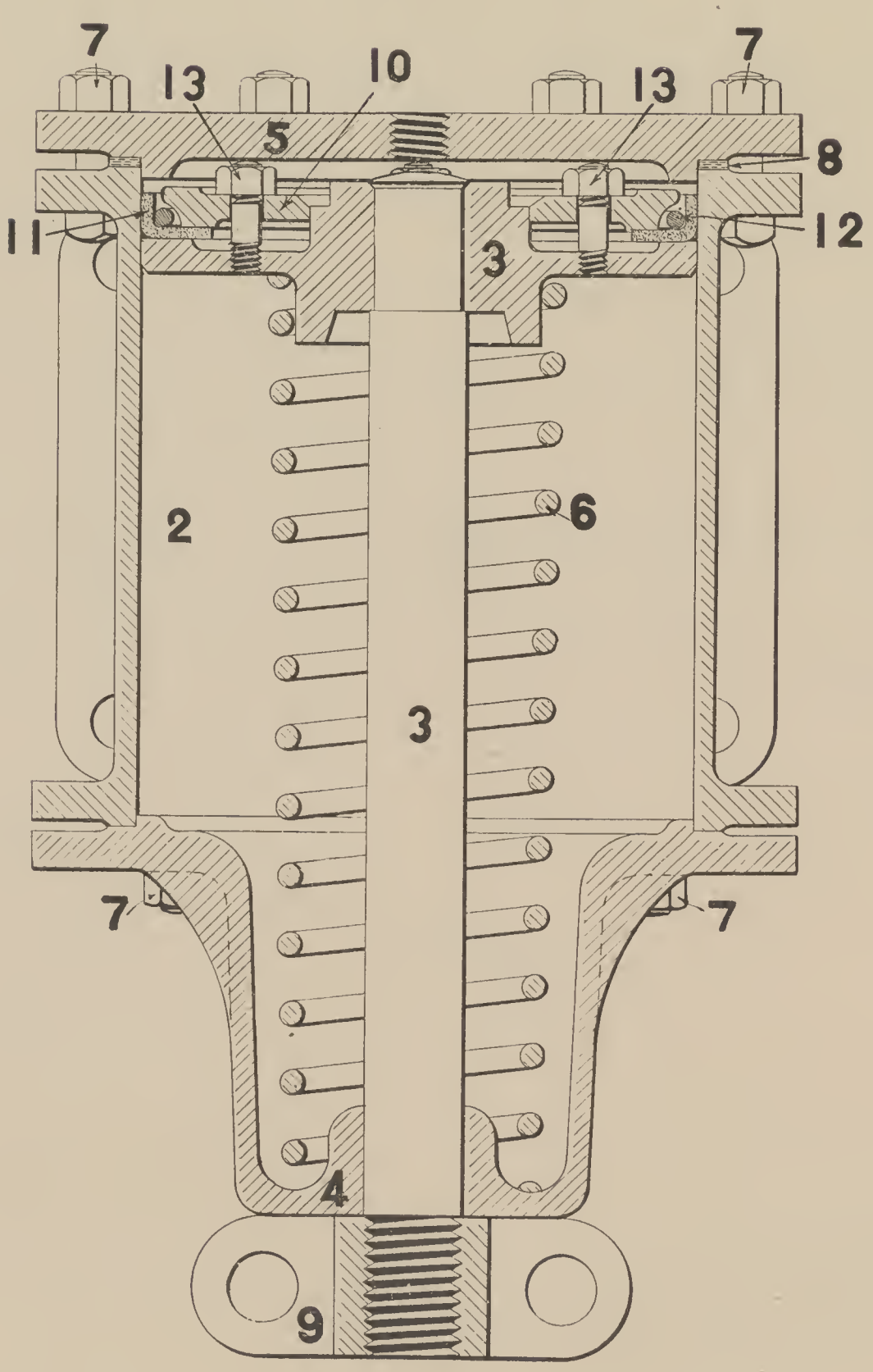
Class or Number of Engine.

The above Diagram shows the information necessary from which to make working drawings for Driver Wheel Brakes for Engines having two pairs of driving wheels, blanks for which will be furnished upon application.

PUSH DOWN DRIVER BRAKE CYLINDER.

(8 in. by 7 in.)

PLATE D12.



PUSH DOWN DRIVER BRAKE CYLINDER.

(8 in. by 7 in.)

PLATE D12.

No. 1. Eight inch by Seven inch Push Down Driver Brake Cylinder, complete.

DETAILS.

No.		No.	
2.	Cylinder Body.	8.	Gasket.
3.	Piston and Rod.	9.	Cross Head (select kind desired from Plate D18.)
4.	Lower Head.	10.	Follower.
5.	Upper Head.	11.	Piston Packing-leather.
6.	Release Spring.	12.	Packing Expander.
7.	Cylinder-head Bolt and Nut.	13.	Follower Stud and Nut.

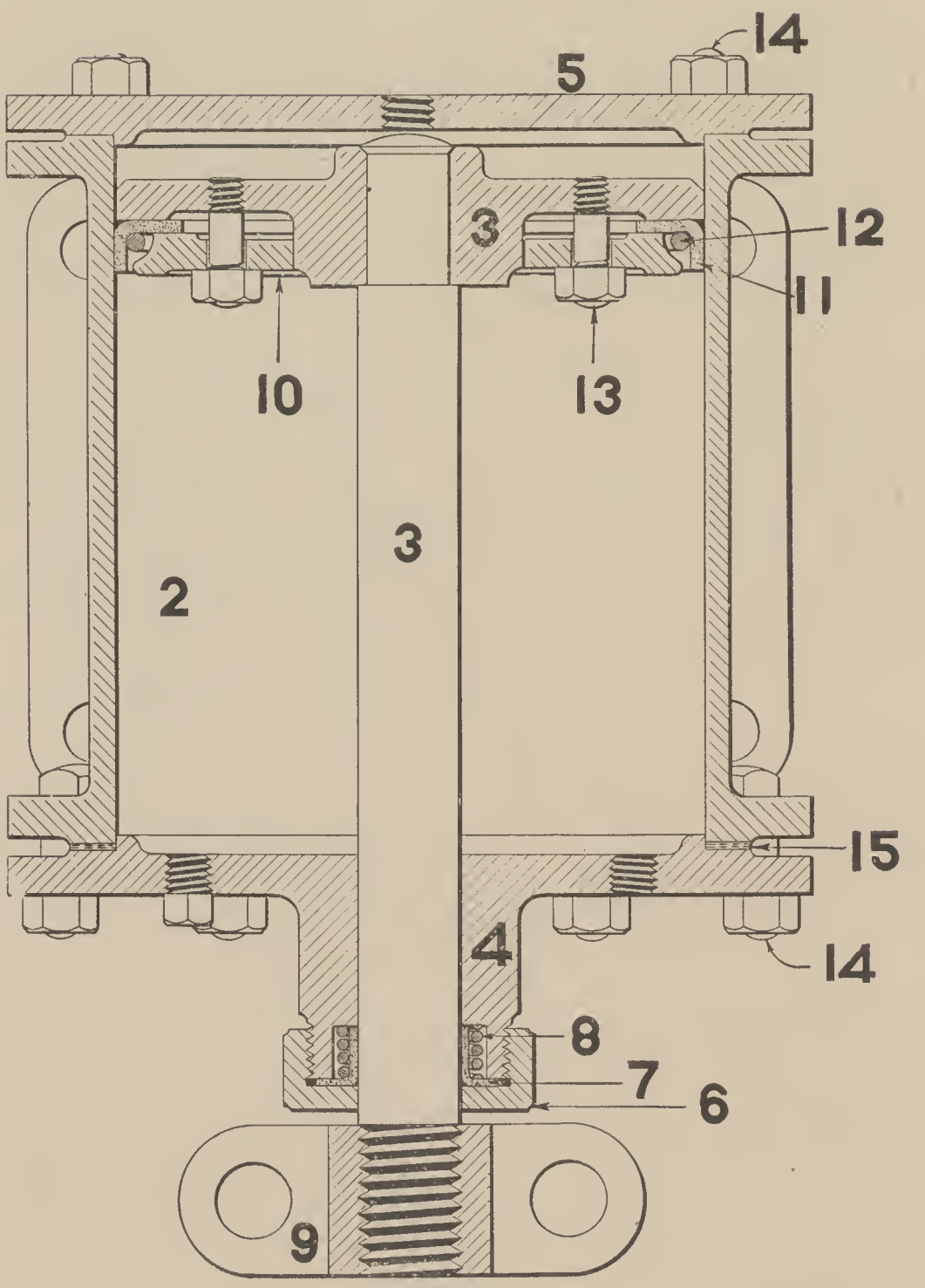
NOTE.—Other sizes of same type of Driver Brake Cylinder are shown in Plate D17. When ordering detail parts for repairs, give number of part desired, as above, and *number* of cylinder intended for. (See Plate D17.)

Orders must give number of Plate and of piece wanted.

PULL UP DRIVER BRAKE CYLINDER.

(8 in. by 7 in.)

PLATE D13.



PULL UP DRIVER BRAKE CYLINDER.

(8 in. by 7 in.)

PLATE D13.

No. 1. Eight inch by Seven inch Pull Up Driver Brake Cylinder, complete.

DETAILS.

No.
2. Cylinder Body.
3. Piston and Rod.
4. Lower Head.
5. Upper Head.
6. Piston Rod Packing-nut.
7. Piston Rod Cup-leather.
8. Piston Rod Packing-spring.

No.
9. Cross Head (select kind desired from Plate D18).
10. Follower.
11. Piston Packing-leather.
12. Packing Expander.
13. Follower Stud and Nut.
14. Cylinder-head Bolt and Nut.
15. Gasket.

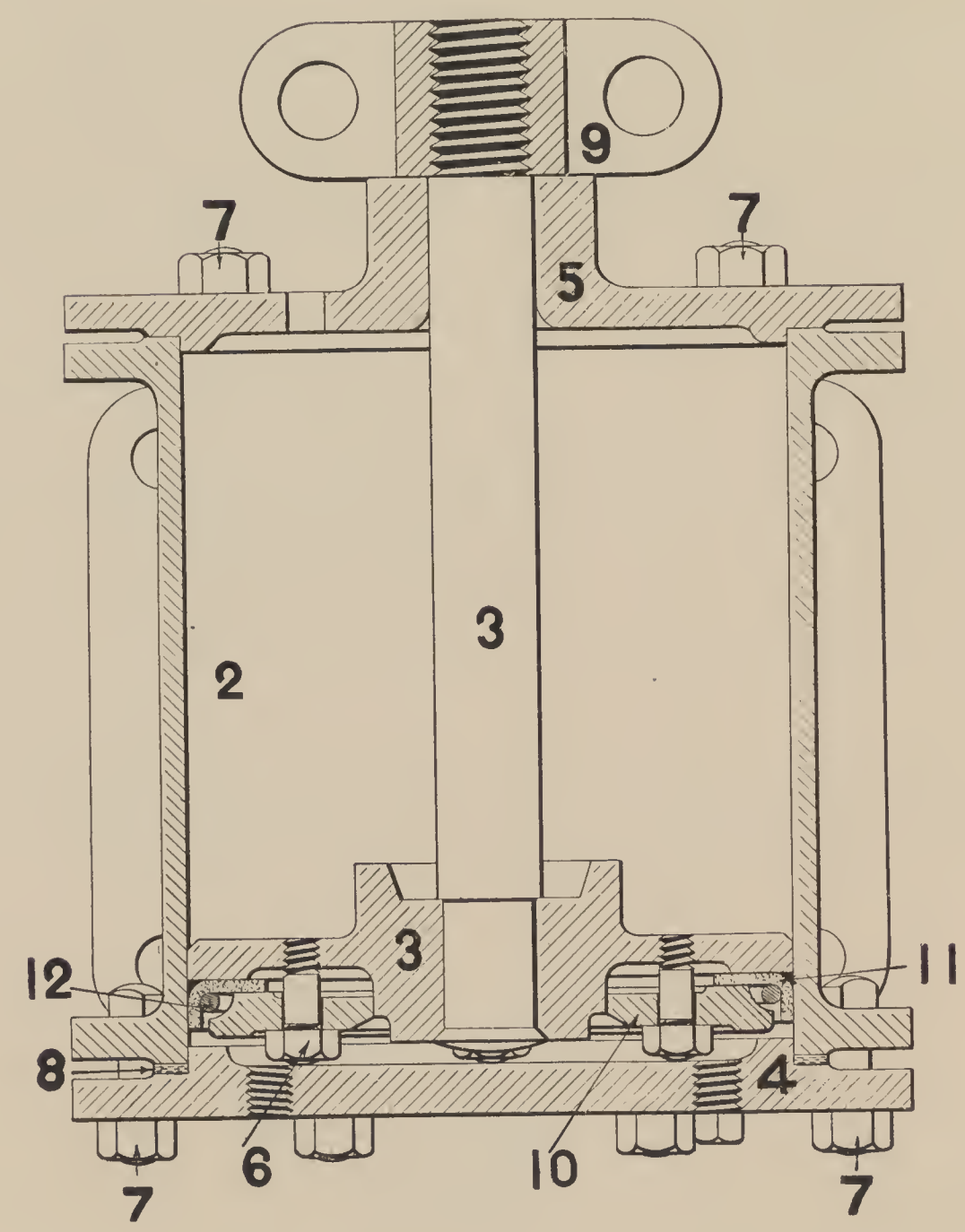
NOTE.—Other sizes of same type of Driver Brake Cylinder are shown in Plate D17. When ordering detail parts for repairs, give number of part desired, as above, and *number* of Cylinder intended for. (See Plate D17.)

Orders must give number of Plate and of piece wanted.

PUSH UP DRIVER BRAKE CYLINDER.

8 in. by 7 in.

PLATE D14.



PUSH UP DRIVER BRAKE CYLINDER.

(8 in. by 7 in.)

PLATE D14.

No. 1. Eight inch by Seven inch Push Up Driver Brake Cylinder, complete.

DETAILS.

No.	
2.	Cylinder Body.
3.	Piston and Rod.
4.	Lower Head.
5.	Upper Head.
6.	Follower Stud and Nut.
7.	Cylinder-head Bolt and Nut.
8.	Gasket.
9.	Cross Head (select kind desired from Plate D18.)
10.	Follower.
11.	Piston-packing Leather.
12.	Packing Expander.

NOTE.—Other sizes of same type of Driver Brake Cylinder are shown in Plate D17. When ordering detail parts for repairs, give number of parts desired, as above, and *number* of Cylinder intended for. (See Plate D17.)

Orders must give number of Plate and of piece wanted.

OUTSIDE EQUALIZED PRESSURE DRIVER BRAKE.

(For three or more pairs of Driving Wheels.)

PLATE D15.

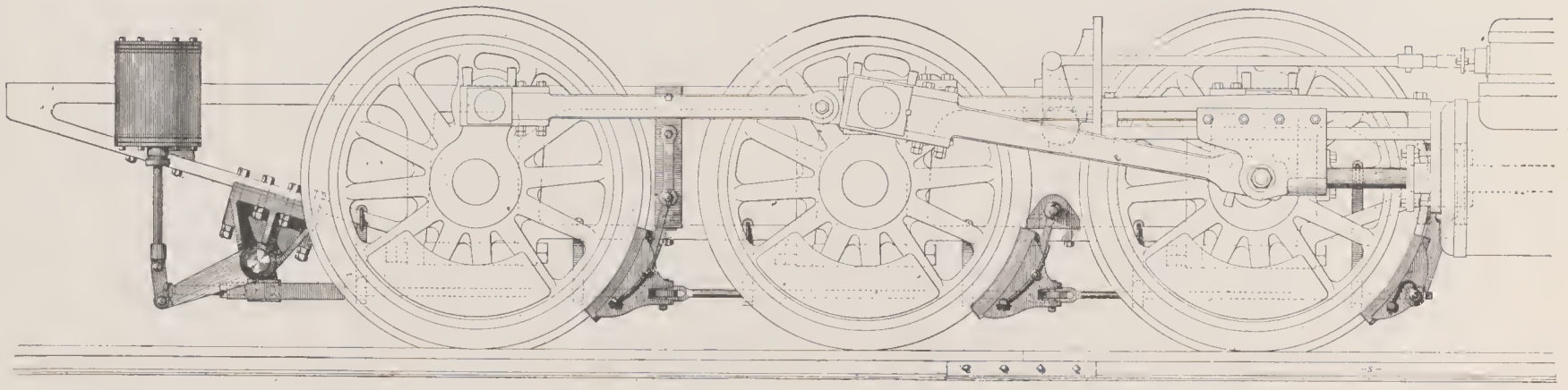
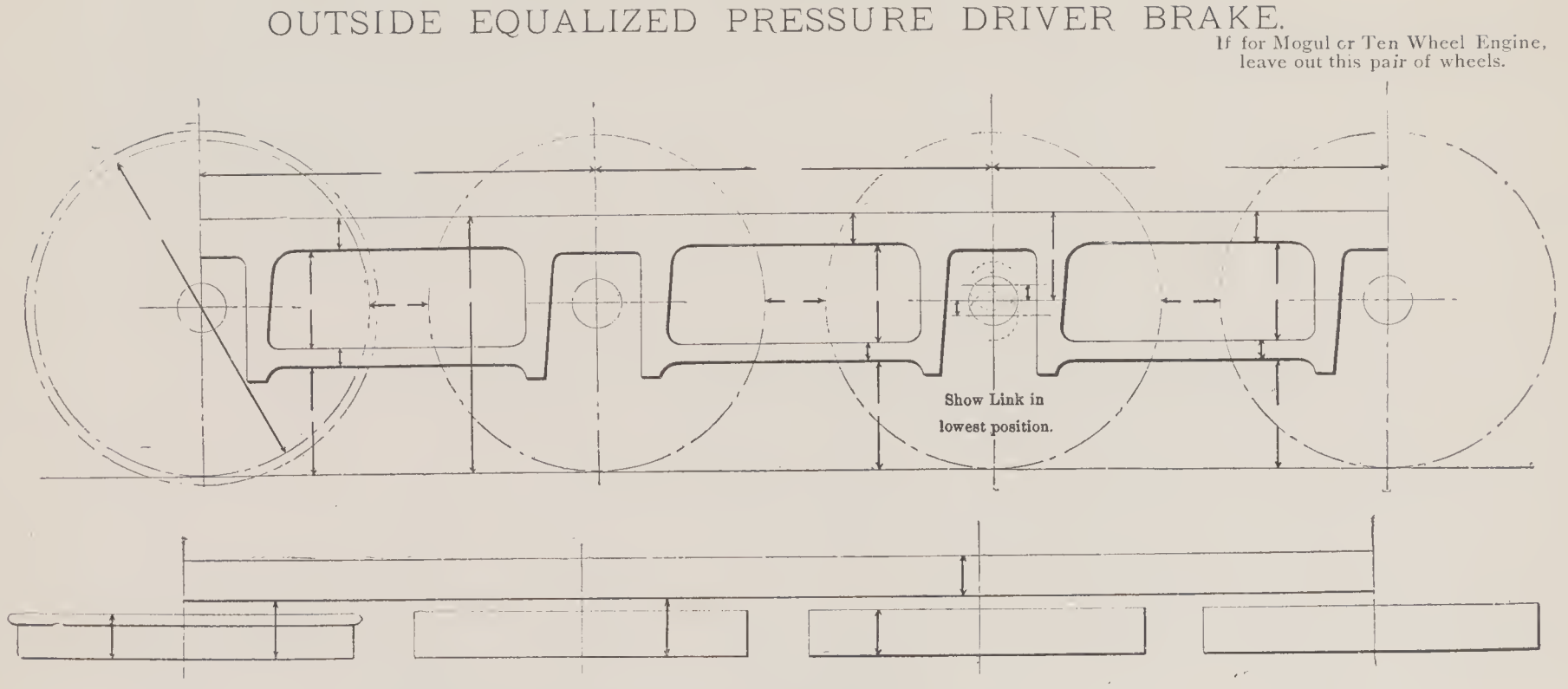


DIAGRAM FOR DESIGNING OUTSIDE EQUALIZED PRESSURE DRIVER BRAKE.



Indicate which are the Flanged Tires,

Fill in carefully all dimensions as indicated by dimension lines, and sketch in ink all tie rods, expansion plates, and any other parts that are attached to the lower rail of the frames, giving their dimensions and the exact position of the bolts by which they are attached to the frame, always giving distance of all parts from nearest wheel center.

Lay out to scale, on reverse of diagram, all of the frame back of the rear pair of drivers, showing all attachments; also that part of the frame between the forward jaw and the saddle, giving the exact location of all bolts by which parts are attached to frames or frames bolted together. Where tracings, drawings or blue prints can be furnished (which are preferable), only the data required in above paragraph need be given.

ADDITIONAL INFORMATION REQUIRED.

Distance between Frames across Engine._____

Distance between Flanged Tires across Engine.____ Builder's Name.

Distance between Blank Tires across Engine._____

Distance between Frame and Side Rod._____

Weight of Engine._____ Name of Road.

Weight on Drivers._____

Thickness of Tire._____

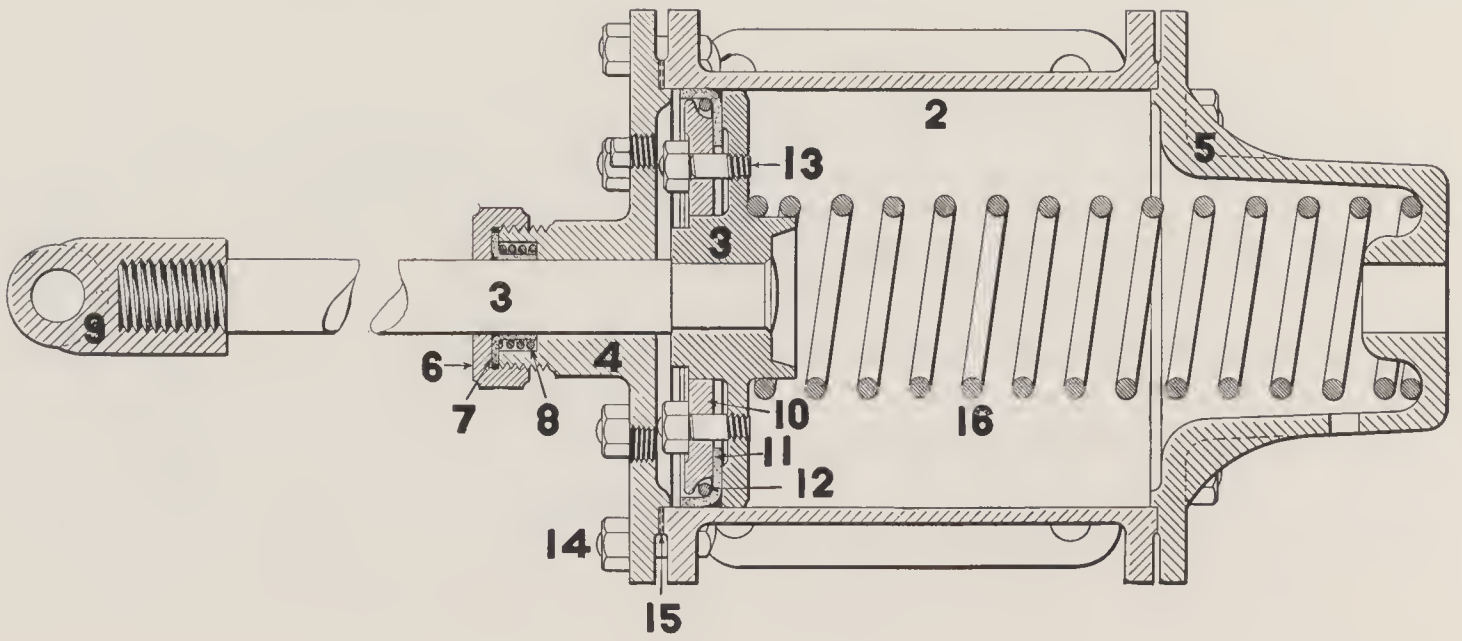
Was Engine light or loaded when measured.____ Number or Class of Engine._____

The above diagram shows the information necessary from which to make working drawings for Driving Wheel Brakes for Engines having more than two pairs of driving wheels, blanks for which will be furnished on application.

HORIZONTAL PULL DRIVER BRAKE CYLINDER.

(10 in. by 12 in.)

PLATE D16.



HORIZONTAL PULL DRIVER BRAKE CYLINDER.

(10 in. by 12 in.)

PLATE D16.

No. 1. Horizontal Pull Driver Brake Cylinder, complete.

DETAILS.

No.		No.	
2.	Cylinder Body.	10.	Follower.
3.	Piston and Rod.	11.	Piston-packing Leather.
4.	Front Head.	12.	Packing Expander.
5.	Back Head.	13.	Follower Stud and Nut.
6.	Piston-rod Packing Nut.	14.	Cylinder-head Bolt and Nut.
7.	Piston-rod Cup Leather.	15.	Gasket.
8.	Piston-rod Packing Spring.	16.	Release Spring.
9.	Cross Head (select kind desired from Plate D18).		

NOTE.—If other sizes of same type of Driver Brake Cylinder are desired, specify diameter and stroke.

Orders must give number of Plate and of piece wanted.

DRIVING WHEEL BRAKE CYLINDERS.

Plate D17.

8″ x 7″ 1

8″ x 7″ 2

8″ x 6″ 3

8″ x 6″ 4

10″ x 8″ 5

10″ x 8″ 8

10″ x 12″ 99

8″ x 7″ 11

8″ x 7″ 22

8″ x 7″ 33

8″ x 7″ 44

10″ x 8″ 55

10″ x 8″ 88

10″ x 12″ 9

6″ x 6″ 6

6″ x 6″ 7

6″ x 6″ 66

6″ x 6″ 77

12″ x 8″ 12

12″ x 10″ 14

8″ x 7″ 16

8″ x 7″ 17

10″ x 8″ 18

10″ x 8″ 19

12″ x 8″ 13

12″ x 10″ 15

P.R.R. 20 SPECIAL

A

Lower Head

DRIVING WHEEL BRAKE CYLINDERS.

Plate D17.

No.

1. Eight inch by Seven inch Pull Up Driver Brake Cylinder (outer flanges full).
2. Eight inch by Seven inch Pull Up Driver Brake Cylinder (outer flanges removed).
3. Eight inch by Six inch Pull Up Driver Brake Cylinder (outer flanges full).
4. Eight inch by Six inch Pull Up Driver Brake Cylinder (outer flanges removed).
5. Ten inch by Eight inch Pull Up Driver Brake Cylinder (outer flanges full).
6. Six inch by Six inch Pull Up Driver Brake Cylinder (outer flanges full).
7. Six inch by Six inch Pull Up Driver Brake Cylinder (outer flanges removed).
8. Ten inch by Eight inch Pull Up Driver Brake Cylinder (outer flanges removed).
9. Ten inch by Twelve inch Pull Up Driver Brake Cylinder (outer flanges full).
11. Eight inch by Seven inch Push Down Driver Brake Cylinder (outer flanges full).
12. Twelve inch by Eight inch Pull Up Driver Brake Cylinder (outer flanges full).
13. Twelve inch by Eight inch Push Down Driver Brake Cylinder (outer flanges full)
14. Twelve inch by Ten inch Pull Up Driver Brake Cylinder (outer flanges full).
15. Twelve inch by Ten inch Push Down Driver Brake Cylinder (outer flanges full.)
16. Eight inch by Seven inch Push Up Driver Brake Cylinder (outer flanges full).
17. Eight inch by Seven inch Push Up Driver Brake Cylinder (outer flanges removed).
18. Ten inch by Eight inch Push Up Driver Brake Cylinder (outer flanges full).
19. Ten inch by Eight inch Push Up Driver Brake Cylinder (outer flanges removed).
20. Special P. R. R.
22. Eight inch by Seven inch Push Down Driver Brake Cylinder (outer flanges removed).
33. Eight inch by Seven inch Push Down Driver Brake Cylinder (outer flanges full).
44. Eight inch by Seven inch Push Down Driver Brake Cylinder (outer flanges removed).
55. Ten inch by Eight inch Push Down Driver Brake Cylinder (outer flanges full).
66. Six inch by Six inch Push Down Driver Brake Cylinder (outer flanges full).
77. Six inch by Six inch Push Down Driver Brake Cylinder (outer flanges removed).
88. Ten inch by Eight inch Push Down Driver Brake Cylinder (outer flanges removed).
99. Ten inch by Twelve inch Push Down Driver Brake Cylinder (outer flanges full).

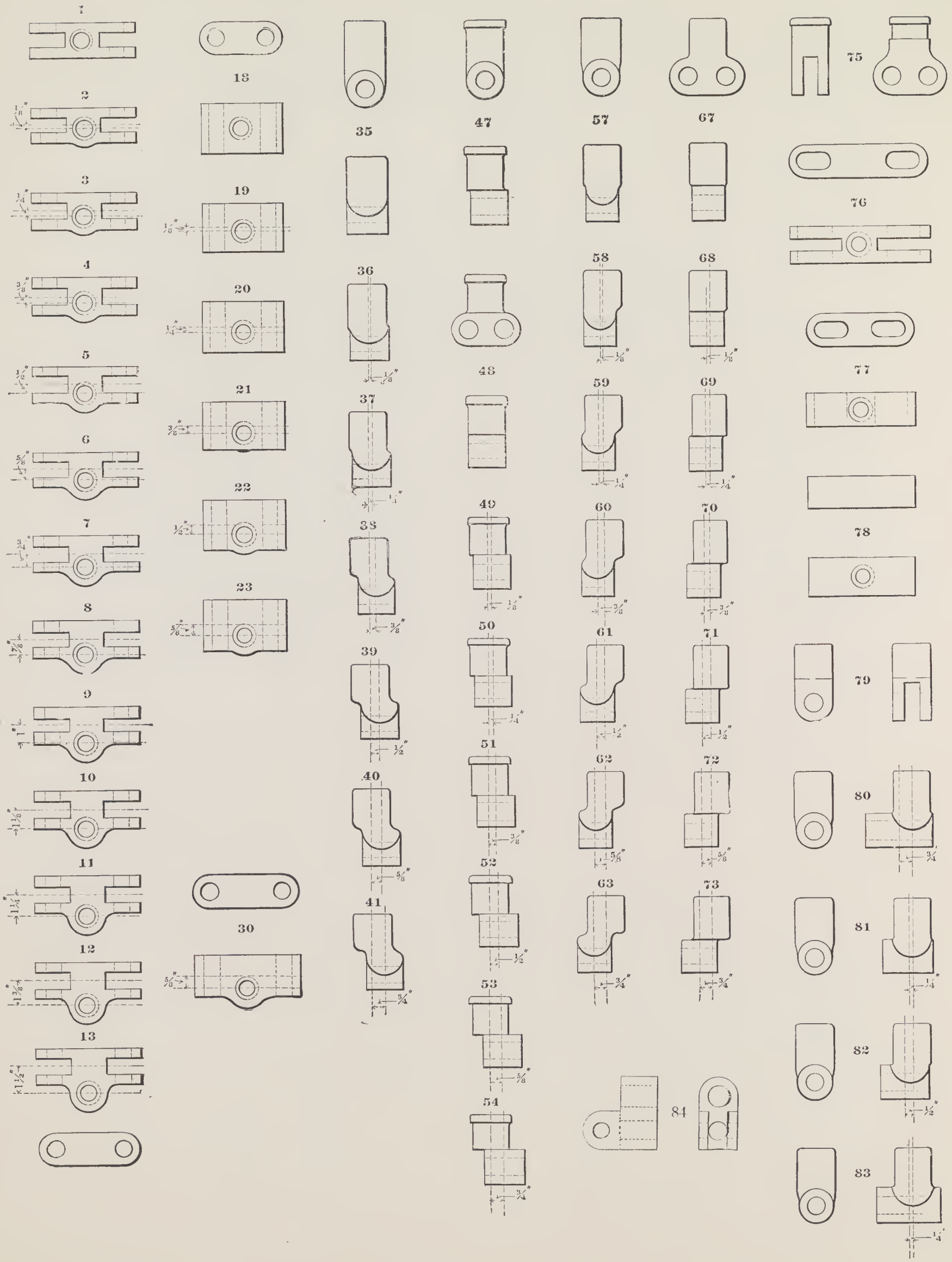
*A. Horizontal Pull Driver Brake Cylinder.

*Specify number of any of above Cylinders in connection with letter A when ordering Cylinders of this particular type.

Orders must give number and size of Cylinder wanted.

CROSS HEADS FOR DRIVING WHEEL BRAKE CYLINDERS.

PLATE D18.



PISTON CROSS HEADS

FOR DRIVING WHEEL BRAKE CYLINDERS.

PLATE D18.

Order by Plate and Number.

Orders must give number of Cross Head wanted.

RESERVOIRS.

Plate D19.

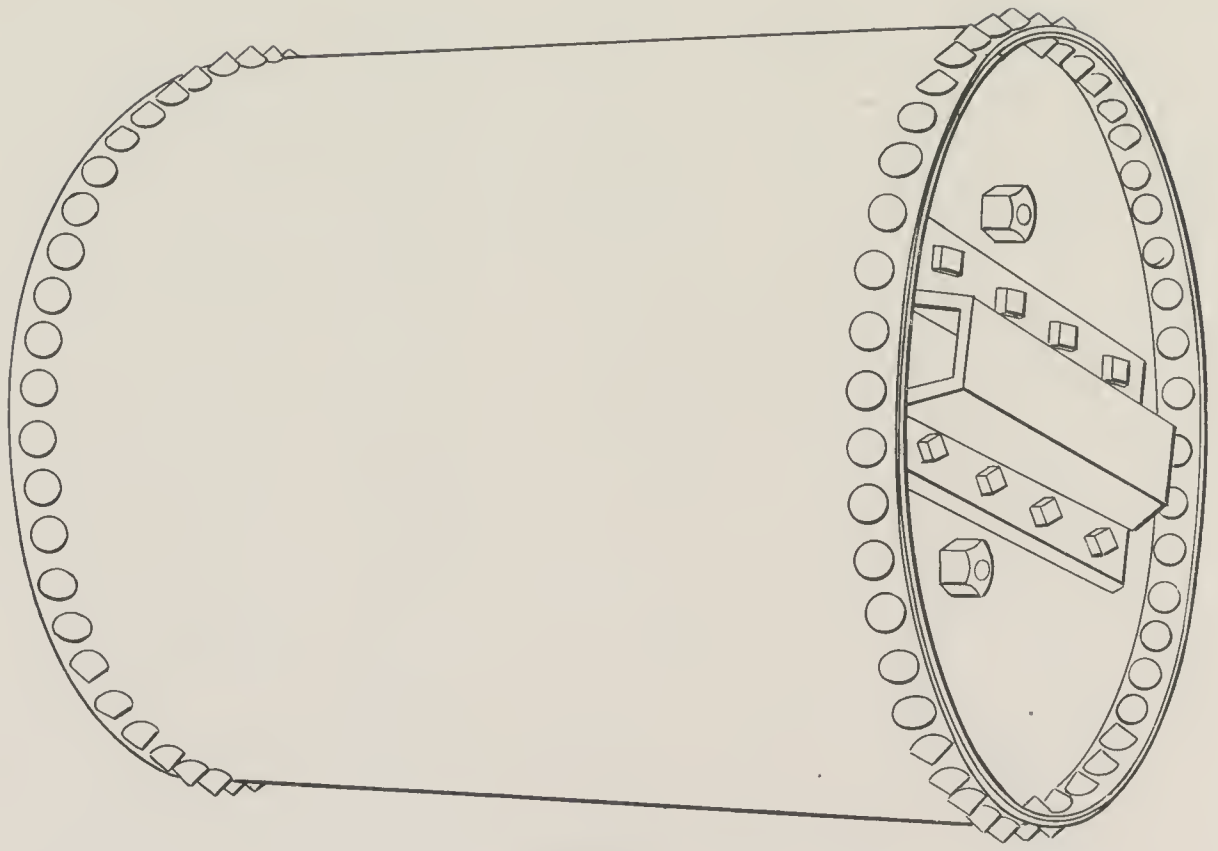


Fig. 1.

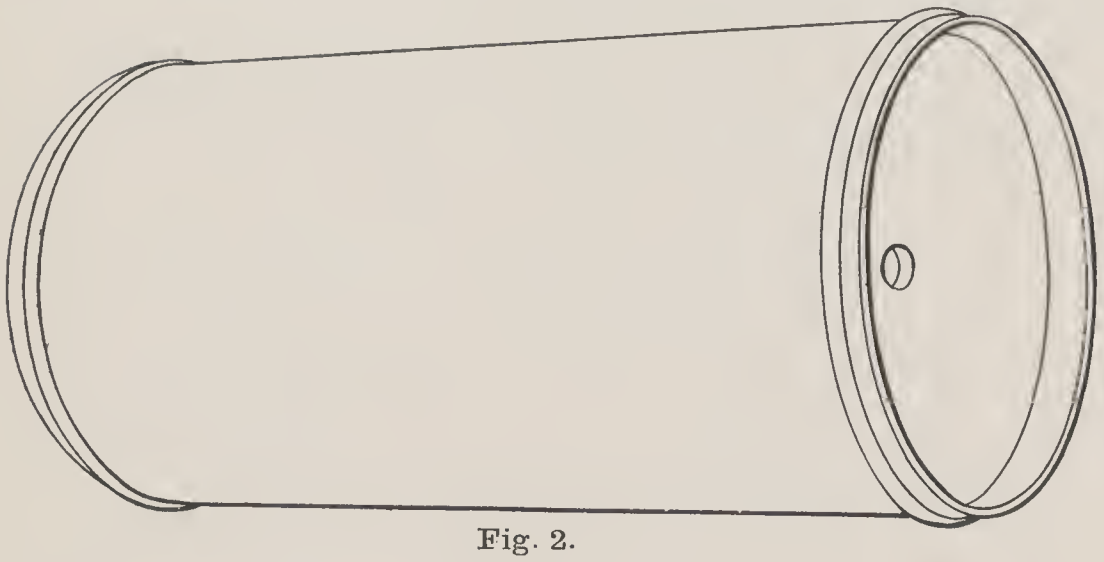


Fig. 2.

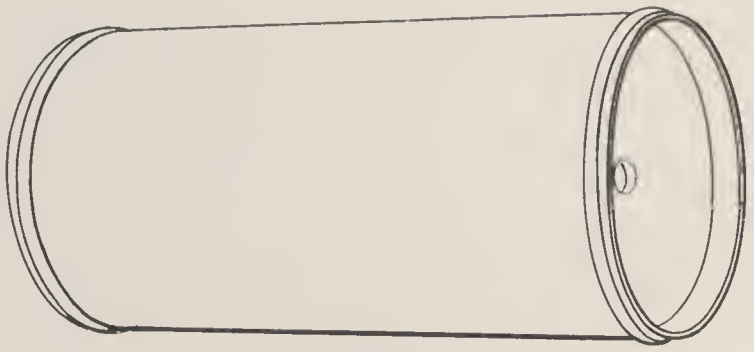


Fig. 4.

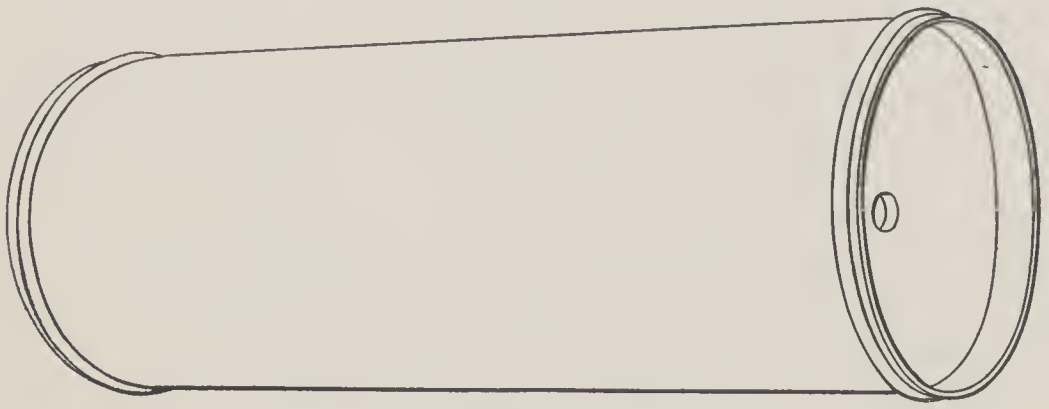


Fig. 3.

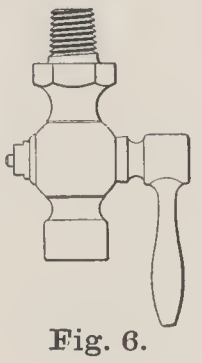


Fig. 6.

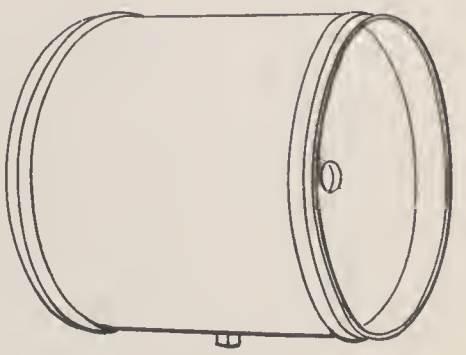


Fig. 5.

RESERVOIRS.

Plate D19.

	Sizes.
Fig. 1.	$22\frac{1}{2}$ inch by 34 inch (outside), about 11,800 cubic inches capacity.
Main Reservoir, .	$24\frac{1}{2}$ " " 34 " " " 14,000 " " "
	$26\frac{1}{2}$ " " 34 " " " 16,500 " " "
	$20\frac{1}{2}$ " " 41 " " " 12,000 " " "
	$22\frac{1}{2}$ " " 41 " " " 14,500 " " "
	$24\frac{1}{2}$ " " 41 " " " 17,000 " " "
	$26\frac{1}{2}$ " " 41 " " " 20,000 " " "

Note.—Main Reservoir Capacity for Passenger Engines should not be less than 16,000, and for Freight Engines not less than 20,000 cubic inches.

Fig. 2.

Standard 16 inch by 33 inch Auxiliary Reservoir. (For Schedule P.)

Fig. 3.

Standard 12 inch by 33 inch Auxiliary Reservoir. (For Schedule A^1, where Driver Brake Cylinders are 10 inches diameter or over; B^1 and C^1.)

Fig. 4.

Standard 10 inch by 24 inch Auxiliary Reservoir. (For Schedule A^1, where Driver Brake Cylinders are 8 inches diameter or under.)

Fig. 5.

Standard 10 inch by 12 inch Equalizing Reservoir. (For Engineer's Brake and Equalizing Discharge Valve.)

Fig. 6.

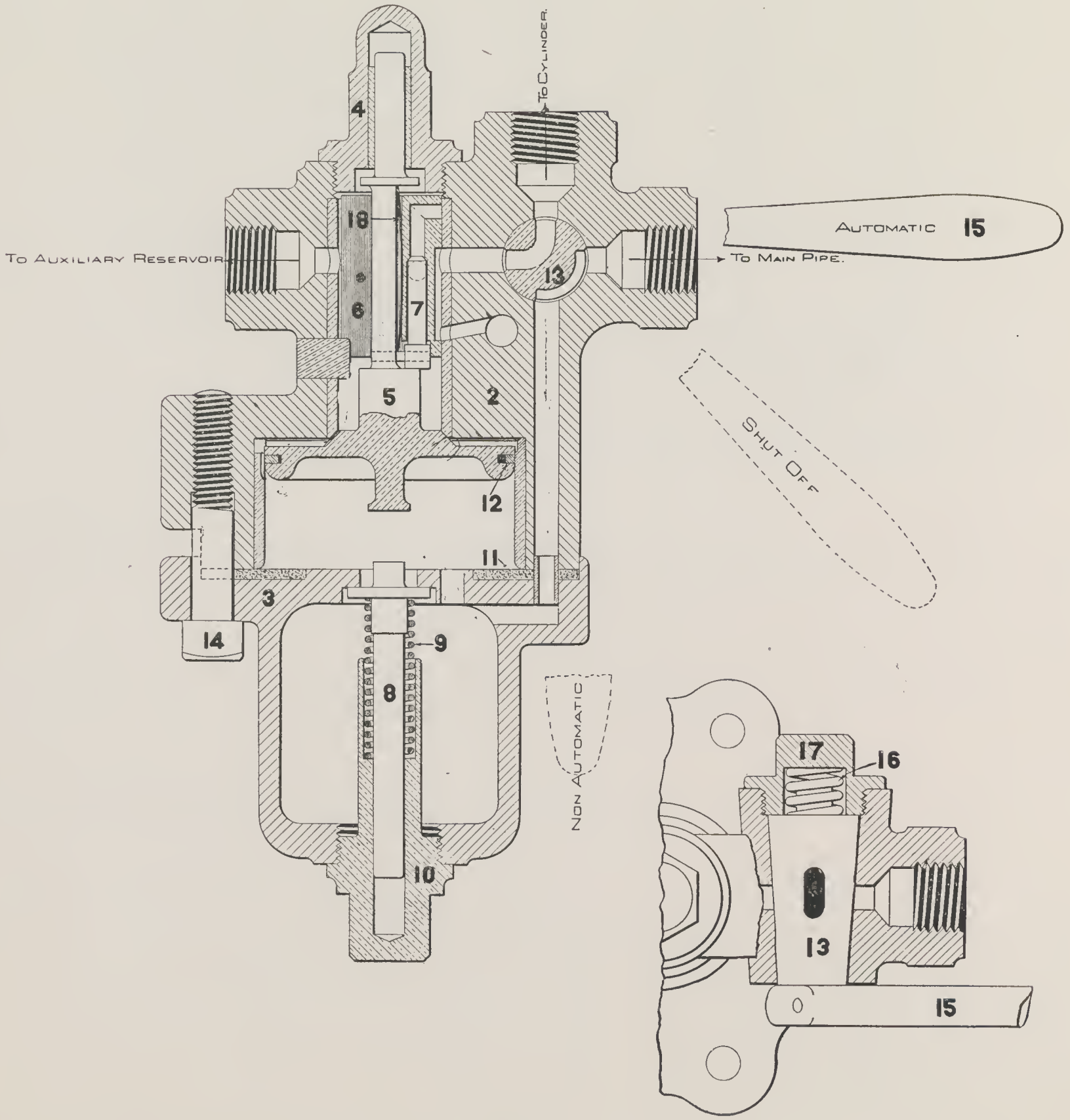
Reservoir Drain Cock.

Orders must give Fig. number and size of Reservoir wanted.

TRIPLE VALVE.

(For Schedules A[1] and B[1].)

PLATE D20.



TRIPLE VALVE.

(For Schedules A[1] and B[1].)

PLATE D20.

No. 1. Triple Valve, complete.

DETAILS.

No.		No.	
2.	Triple Valve Case.	11.	Leather Gasket.
3.	Lower Cap.	12.	Piston-packing Ring.
4.	Upper Cap.	13.	Four-way Cock Key.
5.	Piston.	14.	Bolt.
6.	Slide Valve.	15.	Handle.
7.	Graduating Valve.	16.	Key Spring.
8.	Graduating Stem.	17.	Key Cap.
9.	Graduating-stem Spring.	18.	Slide-valve Spring.
10.	Bottom Nut.		

Orders must give number of Plate and of piece wanted.

TENDER CYLINDERS.

PLATE D21.

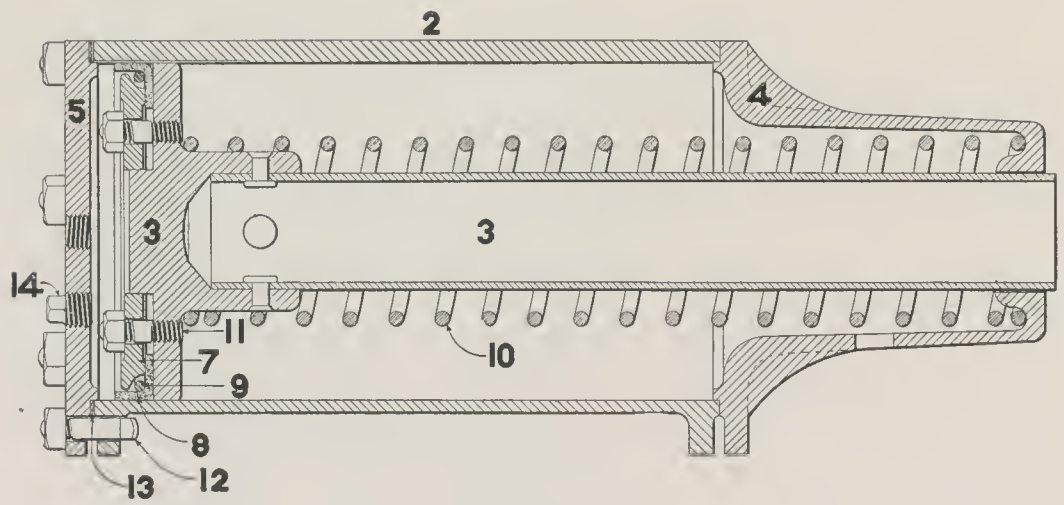


Fig. 1.

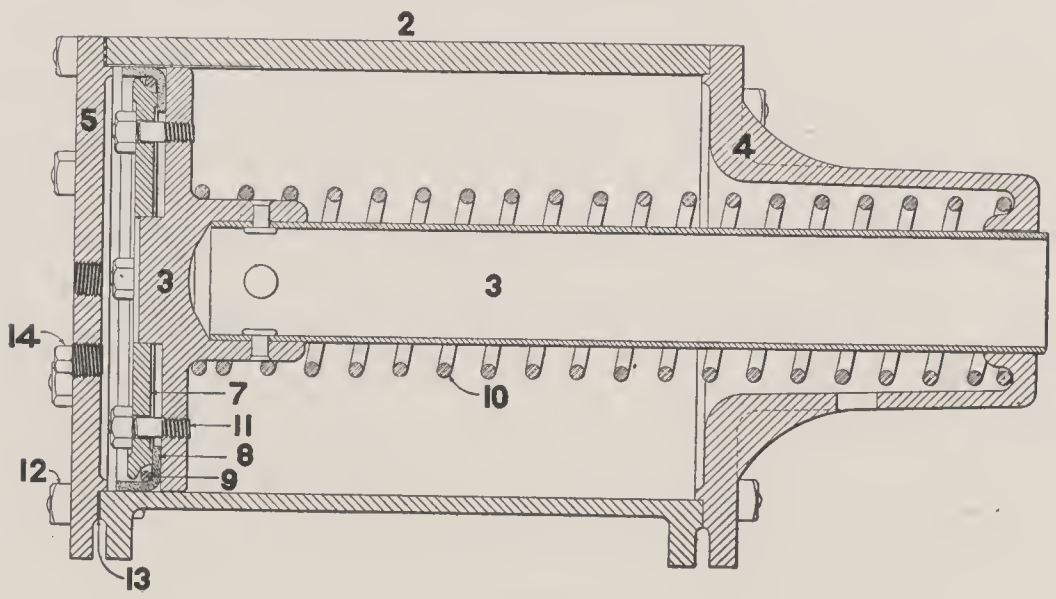


Fig. 2.

TENDER CYLINDERS.

PLATE D21.

Fig. 1.

No. 1. Eight-inch Tender Cylinder, complete.

DETAILS.

No.		No.	
2.	Cylinder Body.	9.	Expander.
3.	Piston and Rod.	10.	Release Spring.
4.	Back Head.	11.	Follower Stud and Nut.
5.	Front Head.	12.	Cylinder-head Bolt and Nut.
7.	Follower.	13.	Gasket.
8.	Packing Leather.	14.	Plug.

Fig. 2.

No. 1. Ten-inch Tender Cylinder, complete.

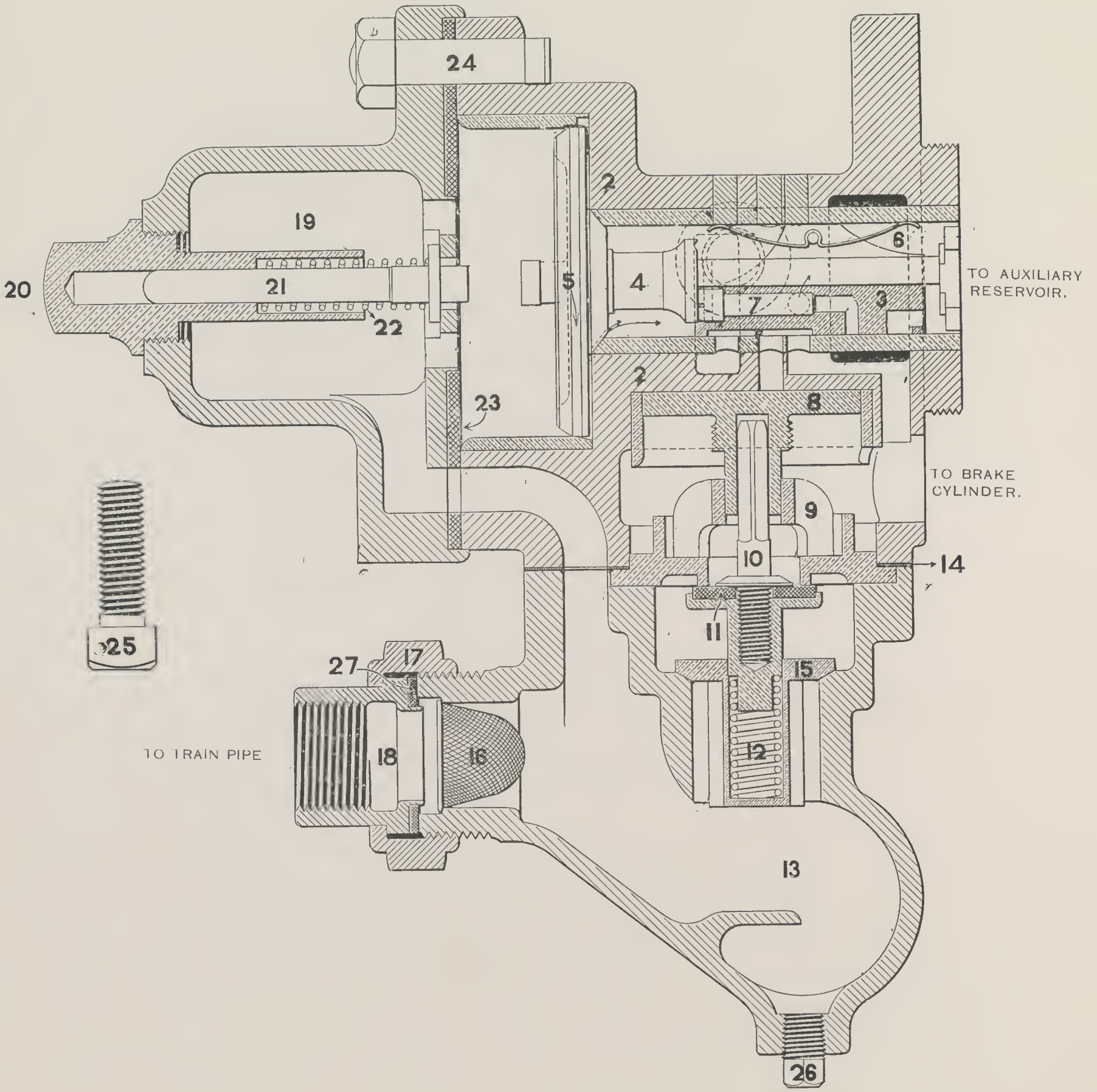
DETAILS.

No.		No.	
2.	Cylinder Body.	9.	Expander.
3.	Piston and Rod.	10.	Release Spring.
4.	Back Head.	11.	Follower Stud and Nut.
5.	Front Head.	12.	Cylinder-head Bolt and Nut.
7.	Follower.	13.	Gasket.
8.	Packing Leather.	14.	Plug.

Orders must give number of Plate and of piece wanted.

QUICK ACTION PASSENGER TRIPLE VALVE.

PLATE D22.



*QUICK ACTION PASSENGER TRIPLE VALVE.

PLATE D22.

No. 1. Standard Passenger Triple Valve, complete.

DETAILS.

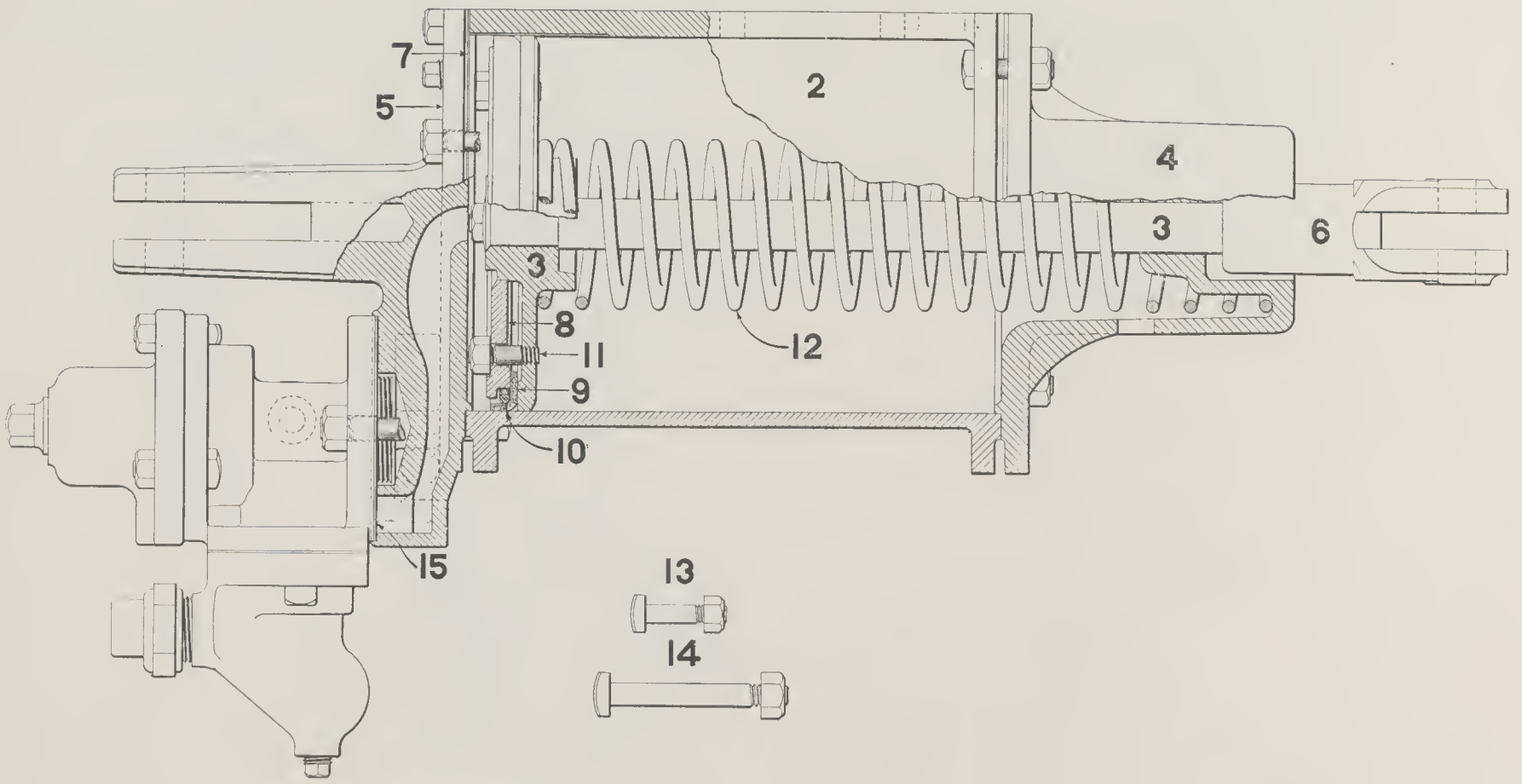
No.		No.	
2.	Triple-valve Body.	15.	Check Valve.
3.	Slide Valve.	16.	Strainer.
4.	Piston.	17.	Union Nut.
5.	Piston-packing Ring.	18.	Union Swivel.
6.	Slide-valve Spring.	19.	Drain Cup.
7.	Graduating Valve.	20.	Graduating-stem Nut.
8.	Emergency-valve Piston.	21.	Graduating Stem.
9.	Emergency-valve Seat.	22.	Graduating Spring.
10.	Emergency Valve.	23.	Leather Gasket.
11.	Seat.	24.	Bolt and Nut.
12.	Check-valve Spring.	25.	Half-inch Cap Screw.
13.	Check-valve Case.	26.	One-half-inch Plug.
14.	Check-valve Case Gasket.	27.	Union Gasket.

Orders must give number of Plate and of piece wanted.

*Passenger Triple Valves may be distinguished from Freight Triple Valves by a letter P being cast upon the outside of the Valve body, and MUST not be used in Freight service.

TEN-INCH CAR CYLINDER.

PLATE D23.



TEN-INCH CAR CYLINDER.

PLATE D23.

No. 1. Ten-inch Car Cylinder, complete.

DETAILS.

No.		No.	
2.	Cylinder Body.	9.	Packing Leather.
3.	Piston and Rod.	10.	Packing Expander.
4.	Back Head.	11.	Follower Stud and Nut.
5.	Front Head.	12.	Release Spring.
6.	Cross Head.	13.	Cylinder-head Bolt and Nut.
7.	Gasket.	14.	Triple-valve Bolt and Nut.
8.	Follower.	15.	Triple-valve Gasket.

Orders must give number of Plate and of piece wanted.

DETAILS OF BRAKE APPARATUS.

PLATE D24.

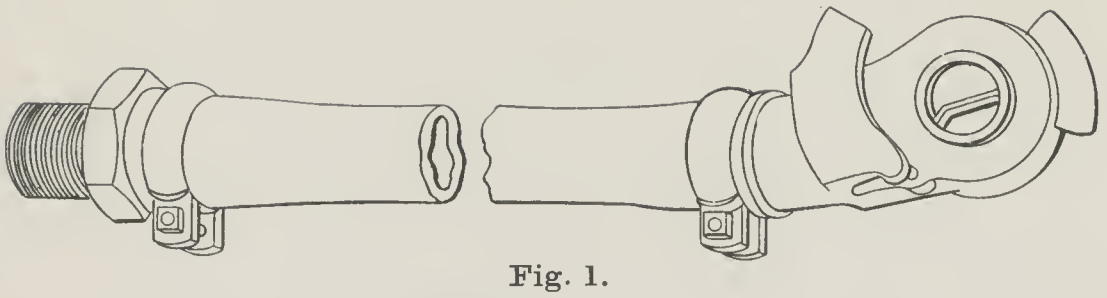


Fig. 1.

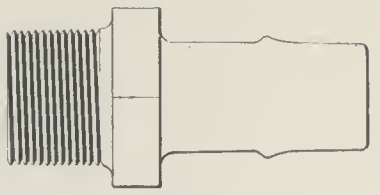


Fig. 4.

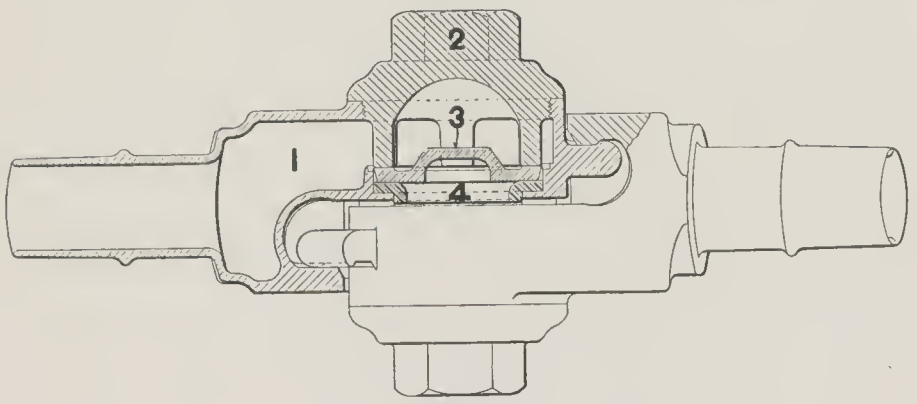


Fig. 2,

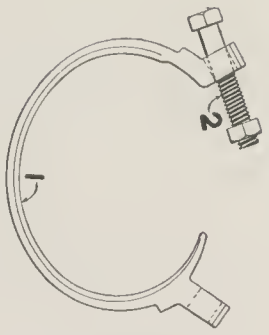


Fig. 5.

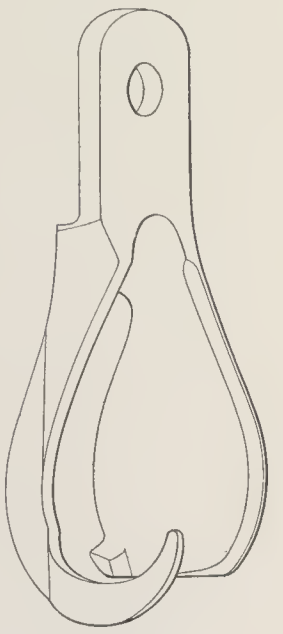


Fig. 6.

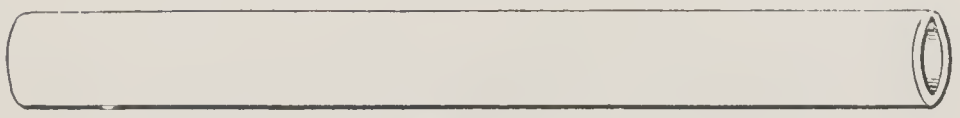


Fig. 3.

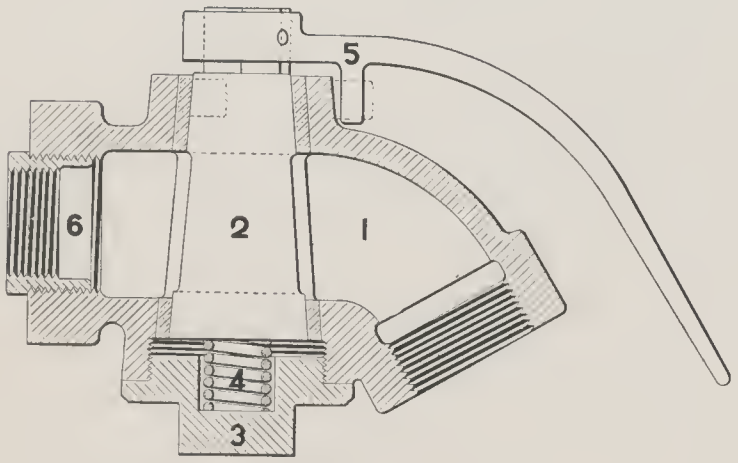


Fig. 7.

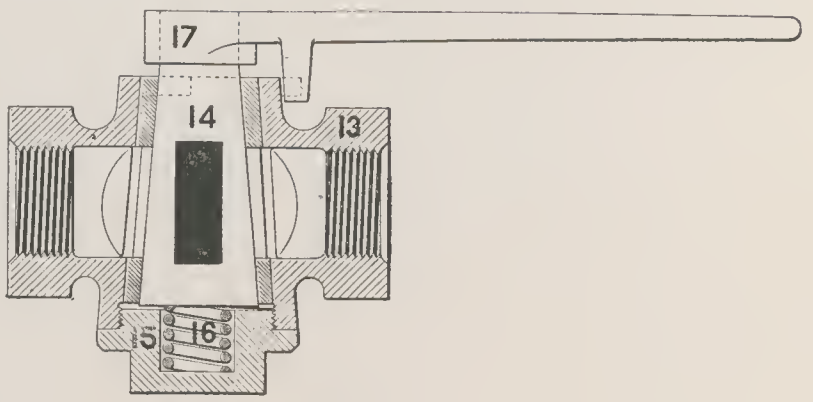


Fig. 8.

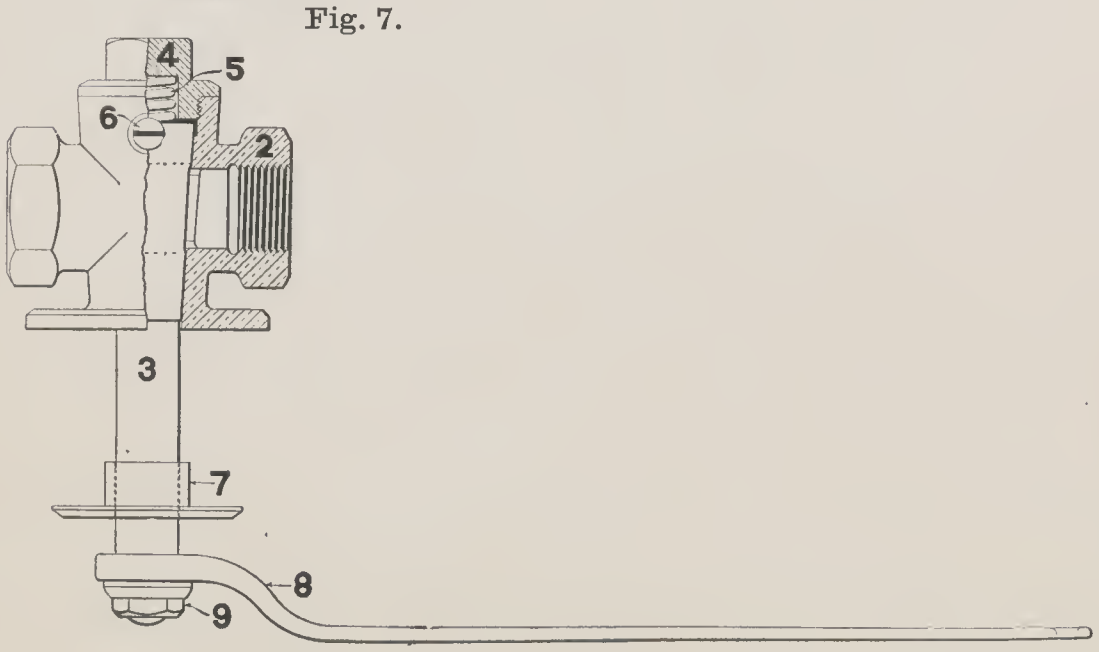


Fig. 9.

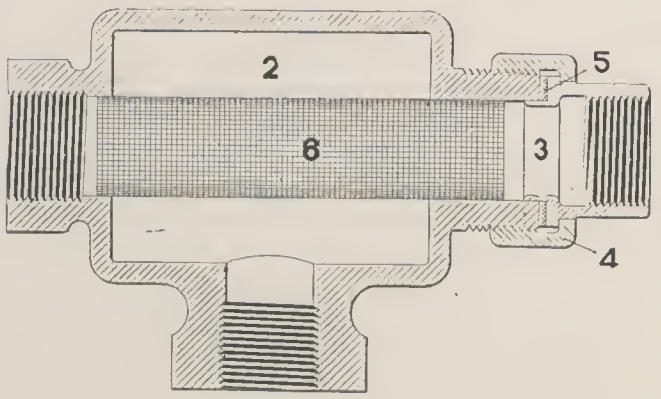


Fig. 10.

DETAILS OF BRAKE APPARATUS.

PLATE D24.

FIG. 1.

Hose and Coupling, complete. Standard for One inch Pipe.

FIG. 2.

Coupling. Standard for One inch Hose.

No.	DETAILS.
1.	Coupling Case.
2.	Coupling Cap.
3.	Packing-ring Washer.
4.	Packing Ring.

FIG. 3.

Standard One inch Hose.

FIG. 4.

One inch by One and One-fourth inch Hose Nipple.

FIG. 5.

No.	
1.	Hose Clamp, One inch.
2.	Hose-clamp Bolt.

FIG. 6.

One inch Coupling Hook.

FIG. 7.

One inch by One and One-fourth inch Angle Cock, complete.

No.	DETAILS.
1.	Angle-cock Body.
2.	Angle-cock Key.
3.	Angle-cock Cap.
4.	Angle-cock Key Spring.
5.	Angle-cock Handle.
6.	One and One-fourth inch to One inch Reducer.

FIG. 8.

One inch Cut-out Cock, complete.

DETAILS.

No.	
13.	Cock Body.
14.	Cock Key.
15.	Cock Cap.
16.	Cock Spring.
17.	Cock Handle.

FIG. 9.

No. 1. Conductor's Valve, complete.

DETAILS.

No.	
2.	Valve Body.
3.	Valve Key,
4.	Valve Cap.
5.	Key Spring.
6.	Key Stop.
7.	Key Escutcheon.
8.	Valve Handle.
9.	Key Nut.
10.	Key Washer.

FIG. 10.

No. 1. One inch Car Drain Cup, complete.

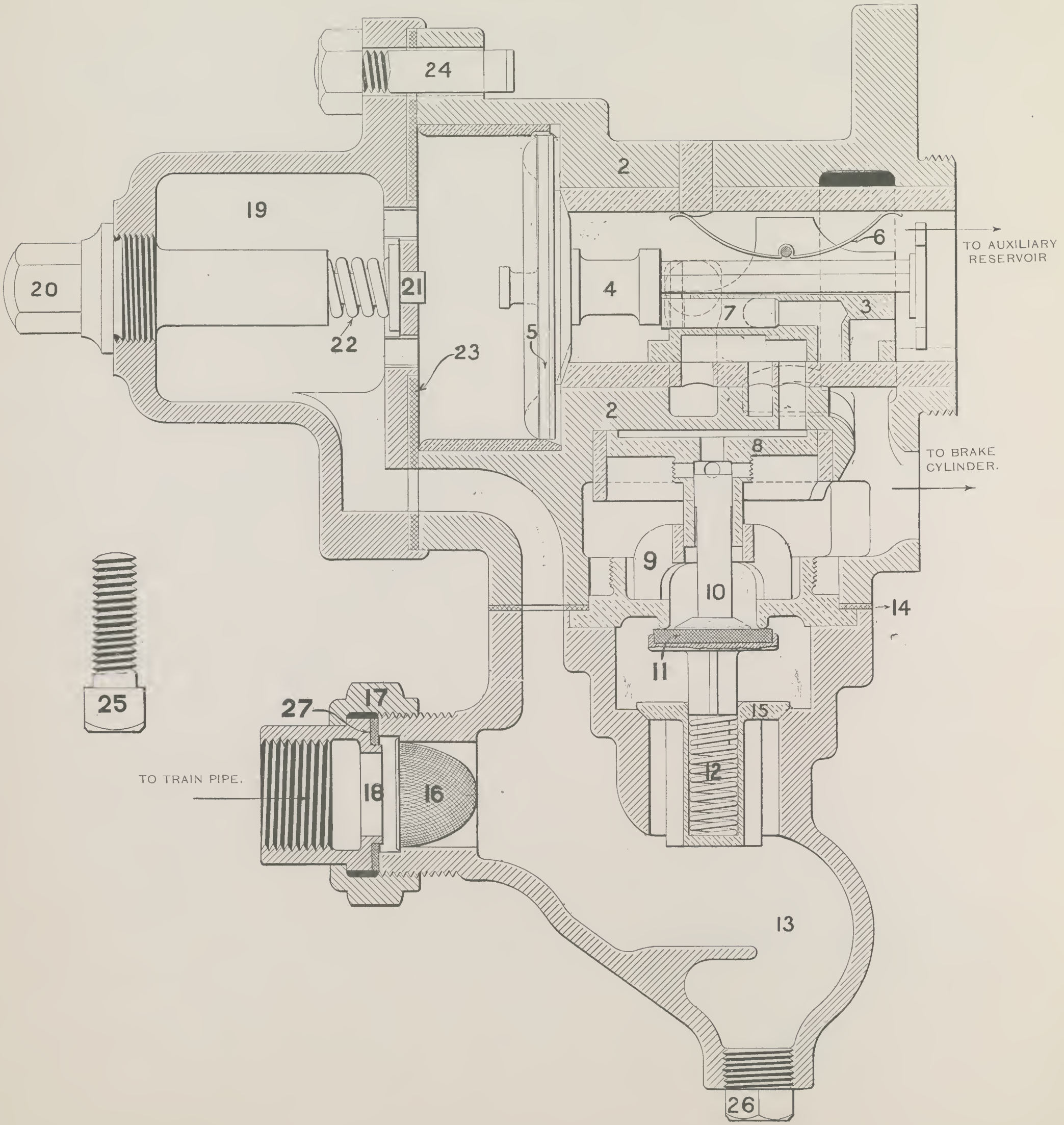
No.	DETAILS.
2.	Drain Cup Body.
3.	One inch Union Swivel.
4.	Union Nut.
5.	Union Gasket.

Orders must give number of Plate and of piece wanted.

"SPECIAL" QUICK ACTION PASSENGER TRIPLE VALVE.

(For Six-wheel Truck Brake.)

PLATE D26.



"SPECIAL" QUICK ACTION PASSENGER TRIPLE VALVE.

(For Six-wheel Truck Brake.)

PLATE D26.

No. 1. "Special" Passenger Quick Action Triple Valve, complete.

DETAILS.

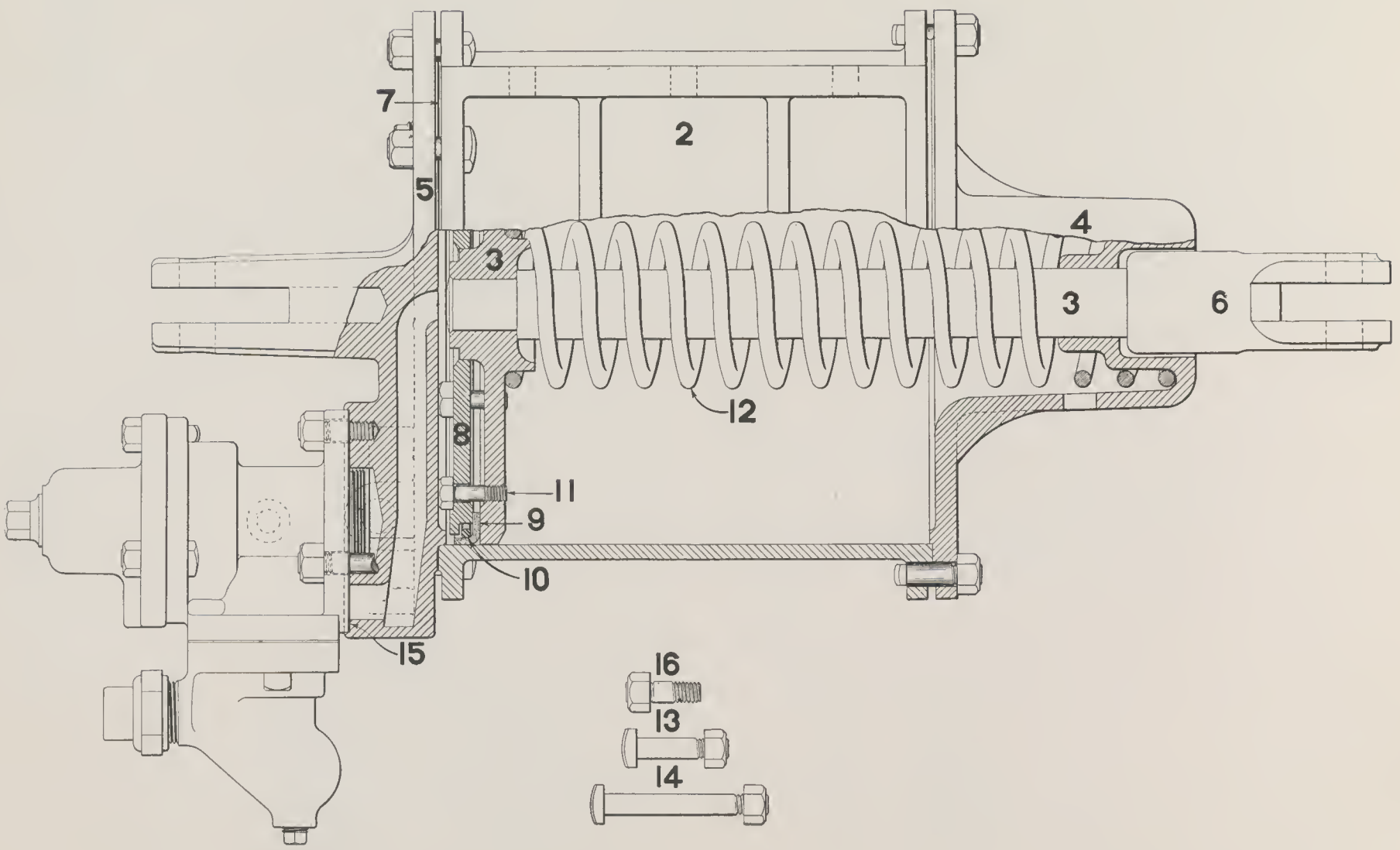
No.		No.	
2.	Triple-valve Body.	15.	Check Valve.
3.	Slide Valve.	16.	Strainer.
4.	Piston.	17.	Union Nut.
5.	Piston-packing Ring.	18.	Union Swivel.
6.	Slide-valve Spring.	19.	Drain Cup.
7.	Graduating Valve.	20.	Graduating-stem Nut.
8.	Emergency-valve Piston.	21.	Graduating Stem.
9.	Emergency-valve Seat.	22.	Graduating Spring.
10.	Emergency Valve.	23.	Leather Gasket.
11.	Rubber Seat.	24.	Bolt and Nut.
12.	Check-valve Spring.	25.	Half-inch Cap Screw
13.	Check-valve Case.	26.	One-half inch Plug.
14.	Check-valve Case Gasket.	27.	Union Gasket.

Orders must give number of Plate and of piece wanted.

"SPECIAL" FOURTEEN-INCH CAR CYLINDER.

(For Six-wheel Truck Brake.)

PLATE D27.



"SPECIAL" FOURTEEN-INCH CAR CYLINDER.

(For Six-wheel Truck Brake.)

PLATE D27.

No. 1. Fourteen-inch Car Cylinder, complete.

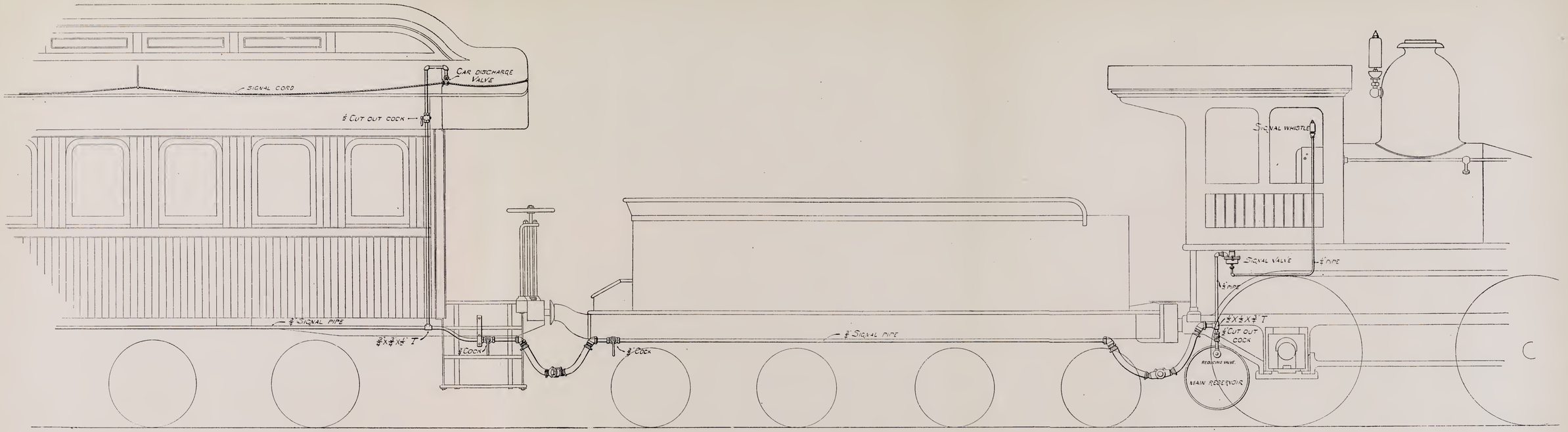
DETAILS.

No.		No.	
2.	Cylinder Body.	10.	Packing Expander.
3.	Piston and Rod.	11.	Follower Stud and Nut.
4.	Back Head.	12.	Release Spring.
5.	Front Head.	13.	Cylinder-head Bolt and Nut.
6.	Cross Head.	14.	Triple-valve Bolt and Nut.
7.	Gasket.	15.	Triple-valve Gasket.
8.	Follower.	16.	Triple-valve Stud and Nut.
9.	Packing Leather.		

Orders must give number of Plate and of piece wanted.

TRAIN SIGNALING APPARATUS.

PLATE D28.



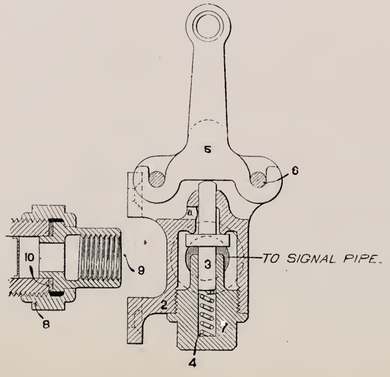


FIG. 1

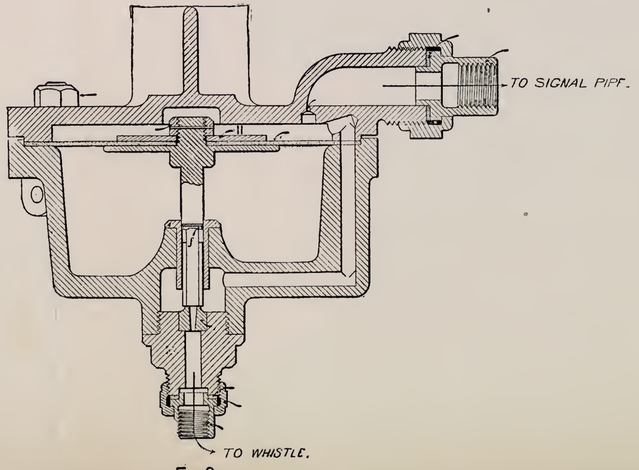


FIG. 2

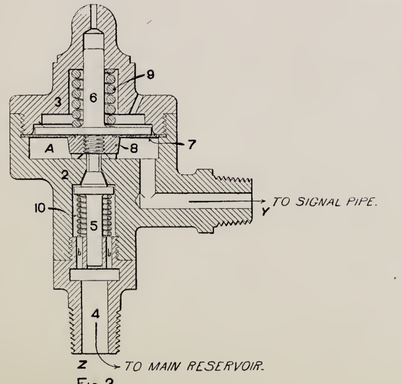


FIG. 3

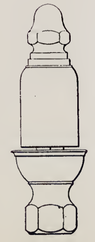


FIG. 4

TRAIN SIGNALING APPARATUS.

PLATE D28.

FIG. 1.

No. 1. Car Discharge Valve, complete.

DETAILS.

No.
2. Discharge-valve Body.
3. Discharge-valve Stem.
4. Discharge-valve Spring.
5. Discharge-valve Handle.
6. Stop Pin.
7. Cap Nut.
8. Union Nut.
9. Union Swivel.
10. Union Gasket.

FIG. 2.

No. 1. Signal Valve, complete.

NOTE.—It is desirable that the Signal Valve be ordered complete or old ones returned for repairs when necessary, thereby insuring the proper adjustment and arrangements of its structural parts.

FIG. 3.

No. 1. Reducing Valve, complete.

DETAILS.

No.
2. Reducing-valve Body.
3. Upper Cap.
4. Lower Cap.
5. Supply Valve.
6. Diaphragm Plate.
7. Reducing-valve Diaphragm.
8. Diaphragm Nut.
9. Diaphragm Spring.
10. Supply-valve Spring.

FIG. 4.

Signal Whistle, complete.

Orders must give number of Plate and of piece wanted.

DETAILS OF SIGNALING APPARATUS.

PLATE D29.

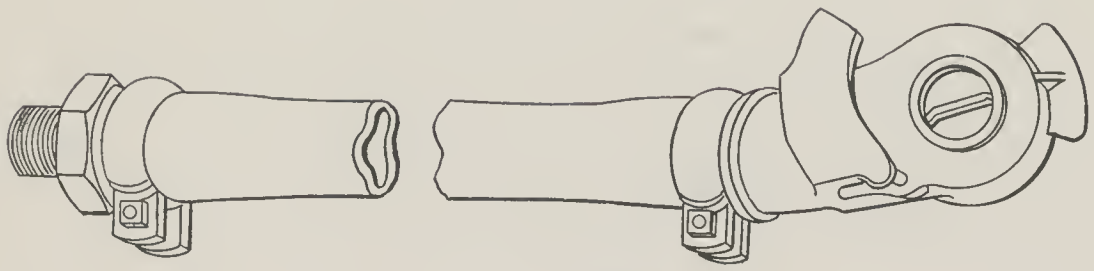


Fig. 1.

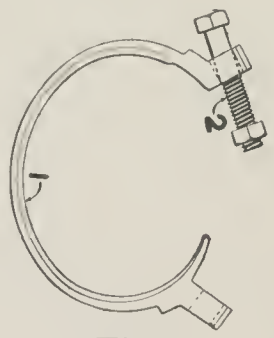


Fig 4.

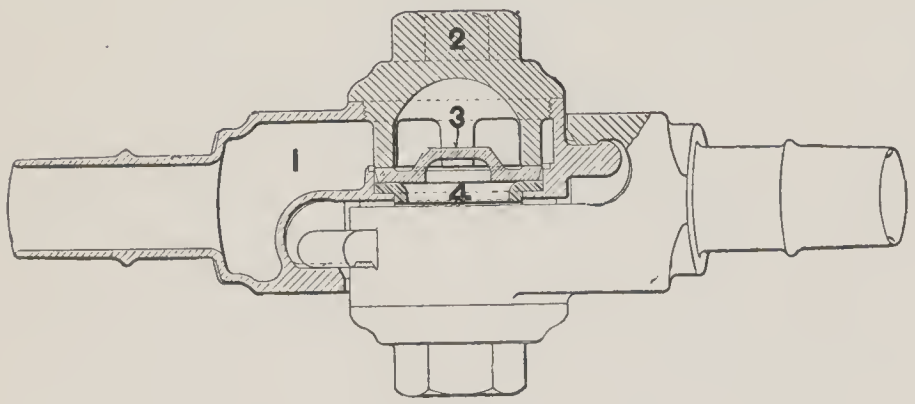


Fig. 2.

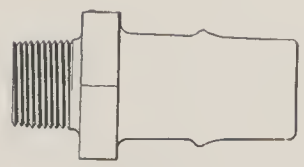


Fig. 5.

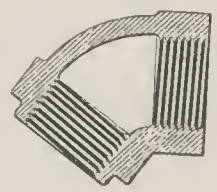


Fig 6.

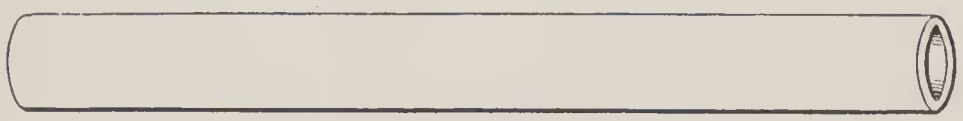


Fig. 3.

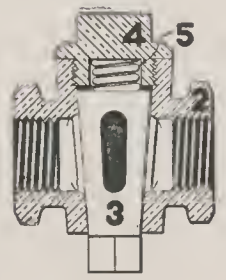


Fig. 7.

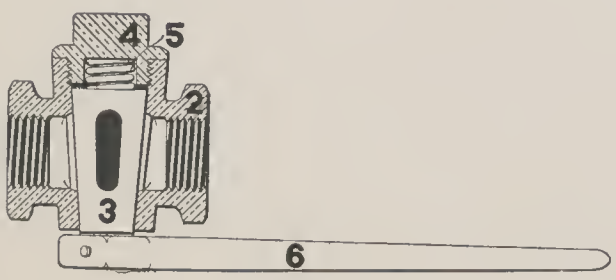


Fig. 8.

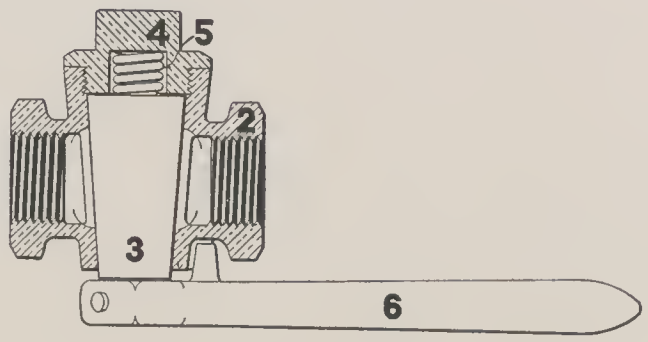


Fig. 9.

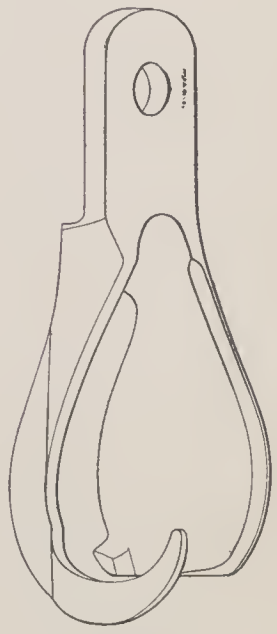


Fig. 10.

DETAILS OF SIGNALING APPARATUS.

Plate D29.

FIG. 1.

Standard Signal Hose and Coupling, complete.

FIG. 2.

Signal Coupling, complete.

DETAILS.

No.
1. Coupling Case.
2. Coupling Cap.
3. Packing-ring Washer.
4. Packing Ring.

FIG. 3.

Standard Signal Hose.

FIG. 4.

No.
1. Hose Clamp.
2. Hose-clamp Bolt.

FIG. 5.

One inch by Three-fourths inch Hose Nipple.

FIG. 6.

Three-fourths inch Angle Fitting.

FIG. 7.

No. 1. One-half inch Stop Cock, without handle.

DETAILS.

No.
2. Stop-cock Body.
3. Stop-cock Key.
4. Stop-cock Cap.
5. Key Spring.

FIG. 8.

No. 1. One-half inch Cut-out Cock, complete.

DETAILS.

No.
2. Cut-out Cock Body.
3. Cut-out Cock Key.
4. Cut-out Cock Cap.
5. Key Spring.
6. Cock Handle.

FIG. 9.

No. 1. Three-fourths inch Cock, complete.

DETAILS.

No.
2. Cock Body.
3. Cock Key.
4. Cock Cap.
5. Key Spring.
6. Cock Handle.

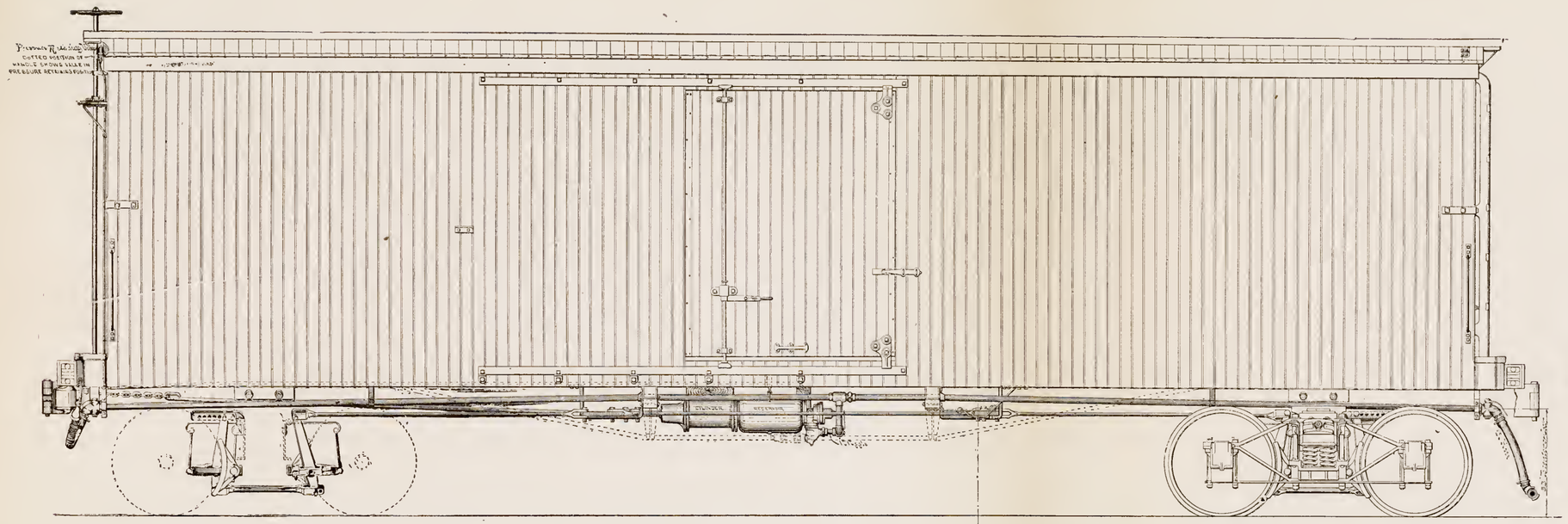
FIG. 10.

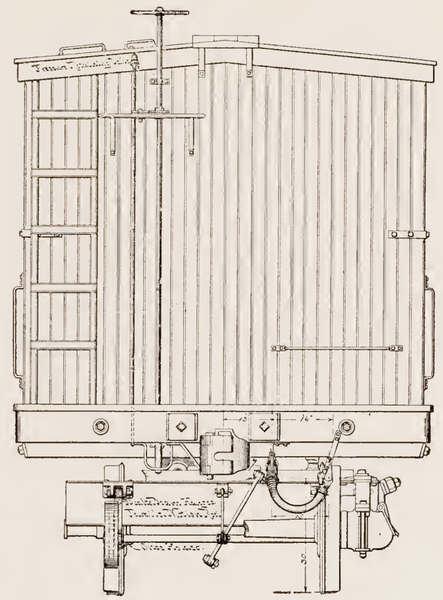
Signal Coupling Hook.

Orders must give number of Plate and of piece wanted.

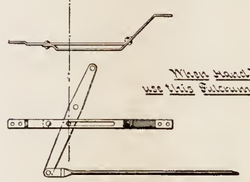
THE WESTINGHOUSE QUICK ACTION AUTOMATIC BRAKE AS APPLIED TO A FREIGHT CAR.

PLATE D30.

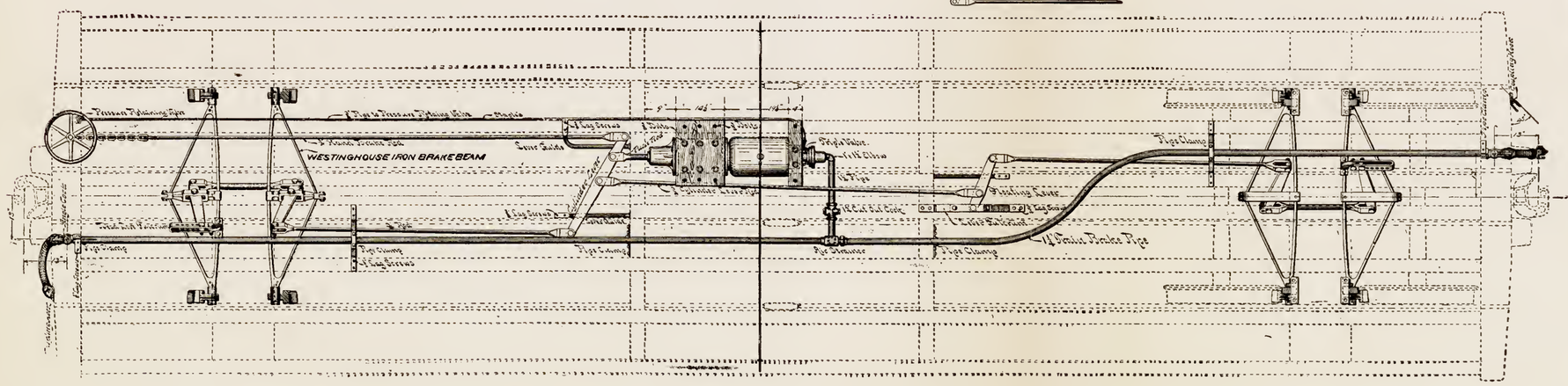


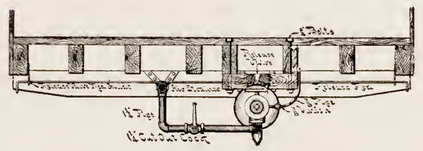


The relative angle of levers should be constructed, where attaching brake rigging to cars
Pipes to be bent where practicable, and blown out with steam after bending
All connections to be perfectly tight, and tested under pressure with soap suds
All pipes to be securely fastened to car timbers, to prevent shaking, and unscrewing of joints
Use reducing coupling at ends, and nut on outside of pipe that screws into fitting.
Where used in connection with engine brake apply to Triple Valve, and interfere with working of brake.



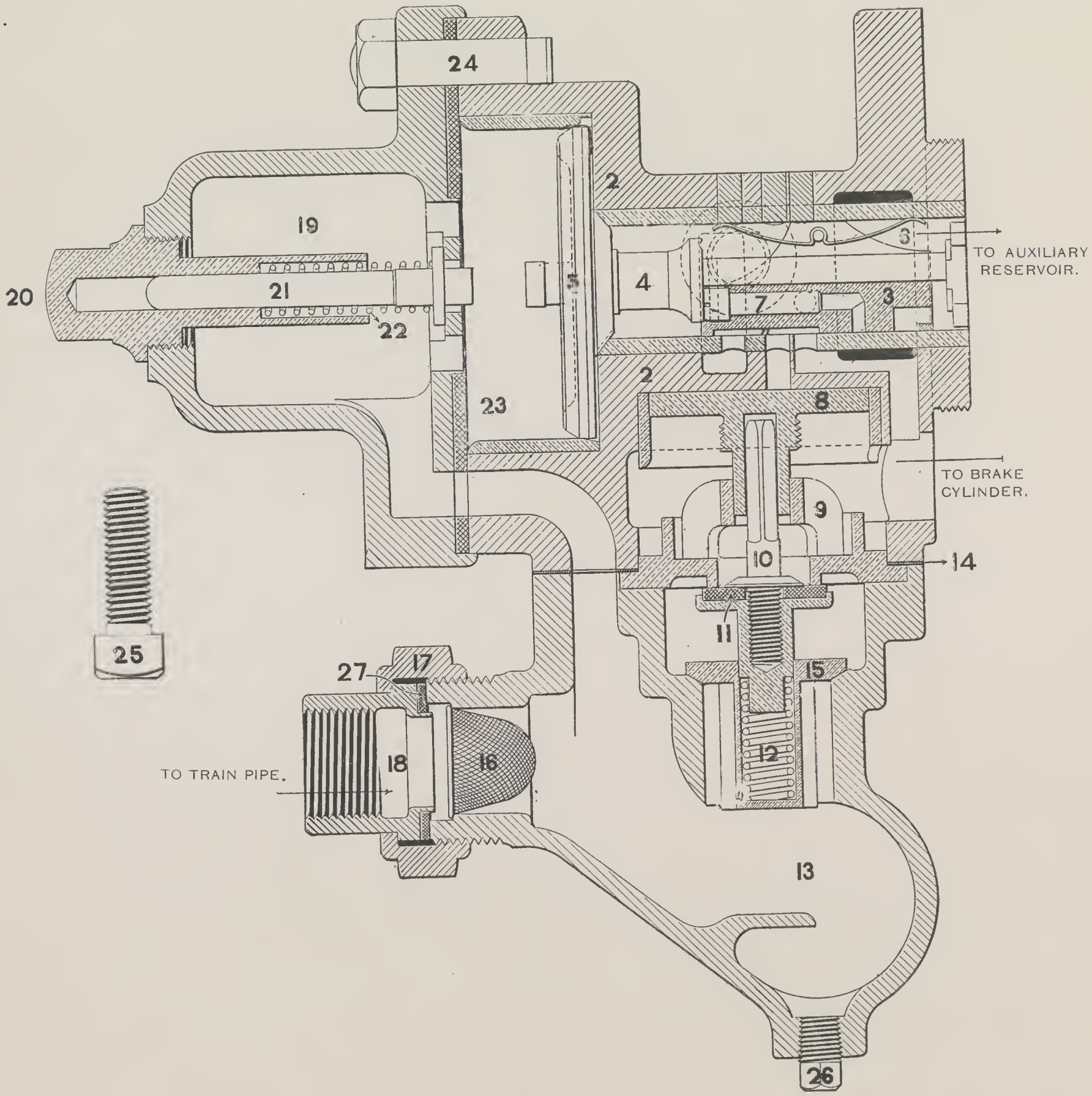
Where Hand Brake is on both ends of Car,
use Valve Between with Lever in place of the Cock.





STANDARD QUICK ACTION FREIGHT TRIPLE VALVE.

PLATE D31.



*STANDARD QUICK ACTION FREIGHT TRIPLE VALVE.

PLATE D31.

No. 1. Standard Quick Action Freight Triple Valve, complete.

DETAILS.

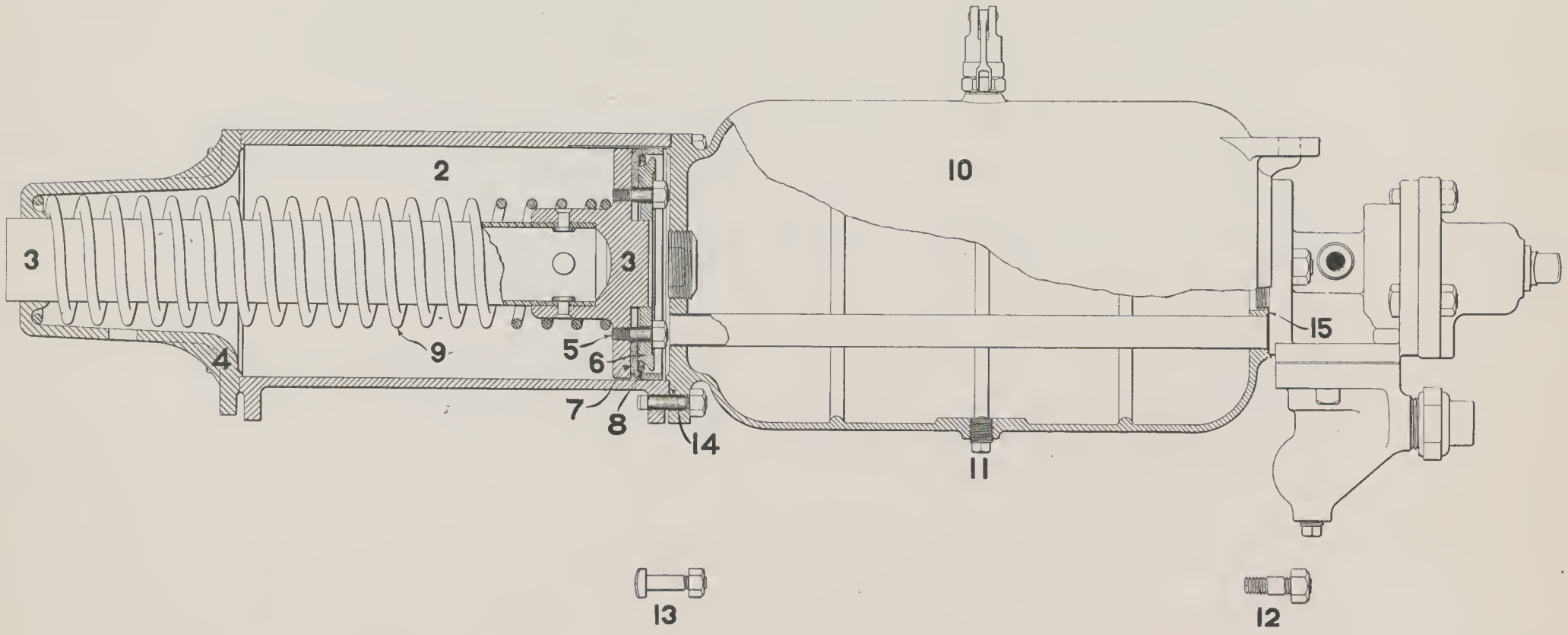
No.		No.	
2.	Triple-valve Body.	15.	Check Valve.
3.	Slide Valve.	16.	Strainer.
4.	Piston.	17.	Union Nut.
5.	Piston Packing-ring.	18.	Union Swivel.
6.	Slide-valve Spring.	19.	Drain Cup.
7.	Graduating Valve.	20.	Graduating-stem Nut.
8.	Emergency-valve Piston.	21.	Graduating Stem.
9.	Emergency-valve Seat.	22.	Graduating Spring.
10.	Emergency Valve.	23.	Leather Gasket.
11.	Rubber Seat.	24.	Bolt and Nut.
12.	Check-valve Spring.	25.	Half-inch Cap Screw.
13.	Check-valve Case.	26.	One-half inch Plug
14.	Check-valve Case Gasket.	27.	Union Gasket.

*The Freight Triple Valve is essentially different in several important respects from the Passenger Triple Valve, and MUST NOT BE USED IN PASSENGER SERVICE. The Passenger Triple Valve having a letter P cast upon the outside of the valve body, the Freight Triple Valve may be distinguished by the absence of this letter.

Orders must give number of Plate and of piece wanted.

STANDARD FREIGHT CYLINDER RESERVOIR AND TRIPLE VALVE.

PLATE D32.



STANDARD
FREIGHT CYLINDER, RESERVOIR AND TRIPLE VALVE.

PLATE D32.

No. 1. Freight Cylinder, Reservoir and Triple Valve, complete.

DETAILS.

No.		No.	
2.	Cylinder Body.	9.	Release Spring.
3.	Piston Head and Rod.	10.	Reservoir.
4.	Back Cylinder Head.	11.	Drain Plug.
5.	Follower Stud and Nut.	12.	Reservoir Stud and Nut.
6.	Piston Follower.	13.	Cylinder-head Bolts.
7.	Piston Packing-leather.	14.	Cylinder Gasket.
8.	Packing-leather Expander.	15.	Triple-valve Gasket.

Triple Valve. See Plate D31.

Orders must give number of Plate and of piece wanted.

DETAILS OF FREIGHT CAR BRAKE APPARATUS.

PLATE D33.

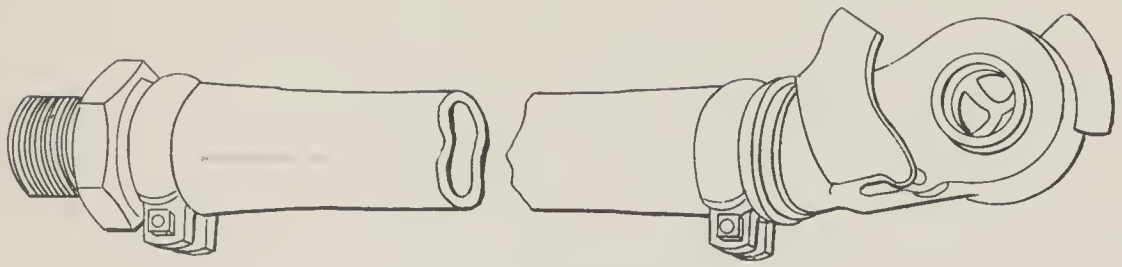


Fig. 1.

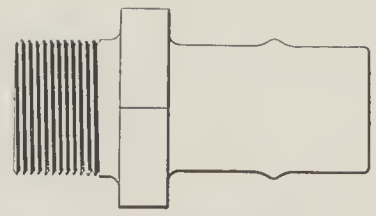


Fig. 4.

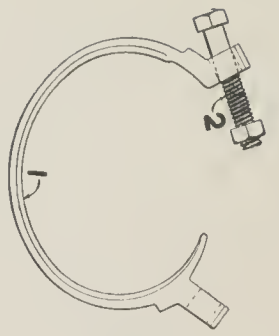


Fig. 5.

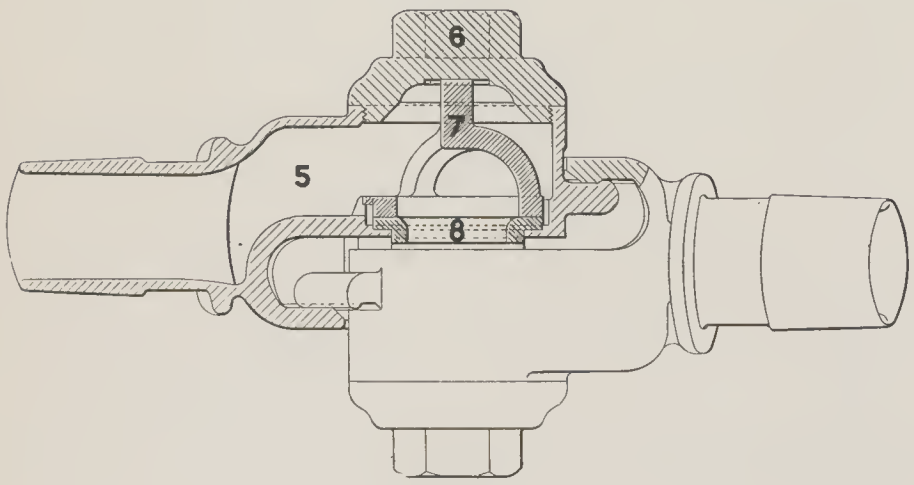


Fig. 2.

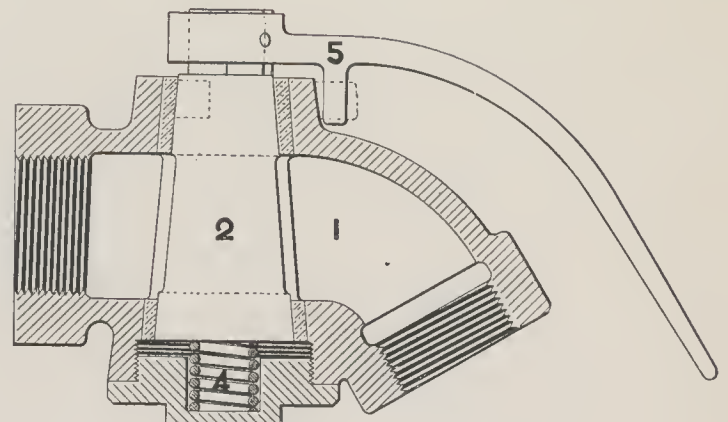


Fig. 6.

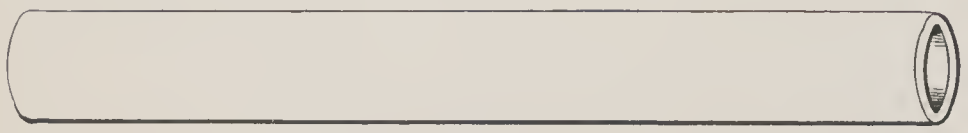


Fig. 3.

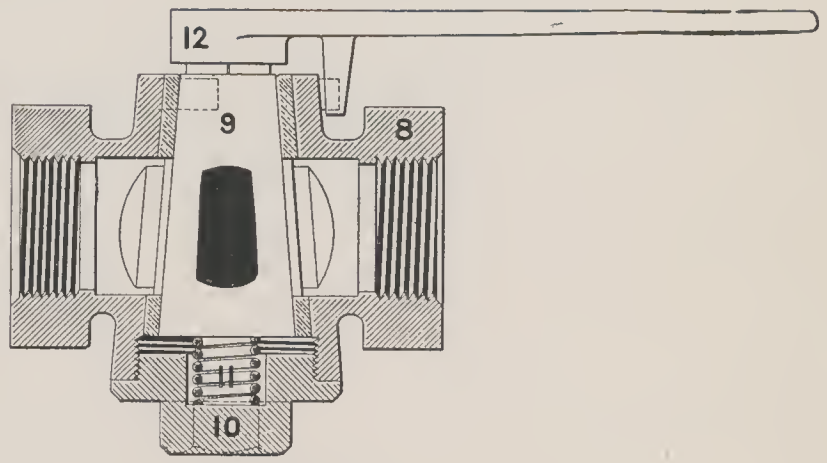


Fig. 7.

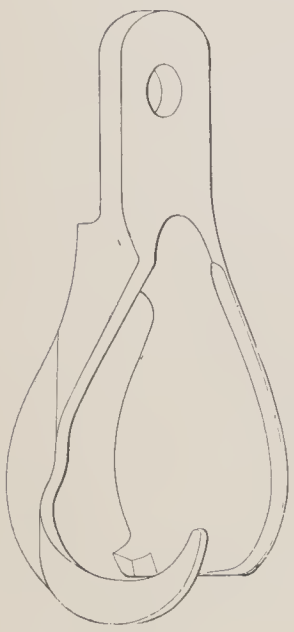


Fig. 8.

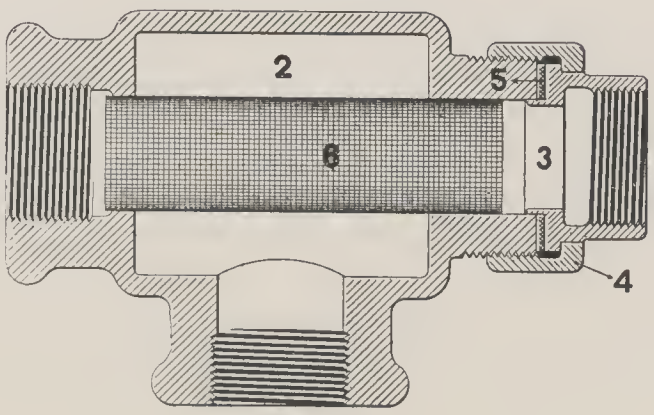


Fig. 9.

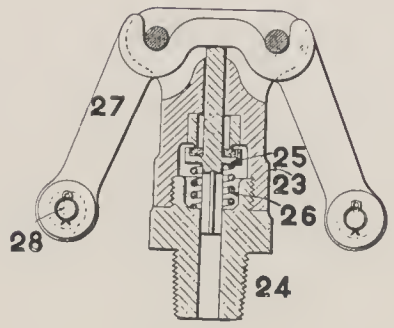


Fig. 10.

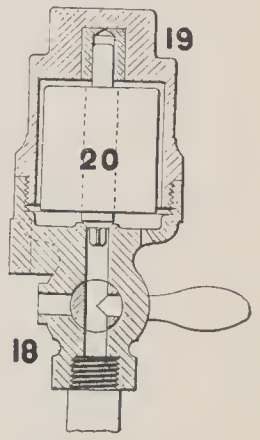


Fig. 11.

DETAILS OF FREIGHT CAR BRAKE APPARATUS.

PLATE D33.

FIG. 1.

One and One-quarter inch Hose and Coupling, complete.

FIG. 2.

Coupling. Standard for One and One-quarter inch Hose.

No.	DETAILS.
5.	Coupling Case.
6.	Coupling Cap.
7.	Packing-ring Washer.
8.	Packing Ring.

FIG. 3.

Standard One and One-quarter inch Hose.

FIG. 4.

One and One-quarter inch Hose Nipple.

FIG. 5.

No.	
1.	One and One-quarter inch Hose Clamp.
2.	Hose-clamp Bolt.

FIG. 6.

One and One-fourth inch Angle Cock, complete.

No.	DETAILS.
1.	Angle-cock Body.
2.	Angle-cock Key.
3.	Angle-cock Cap.
4.	Angle-cock Spring.
5.	Angle-cock Handle.

FIG. 7.

One and One-quarter inch Cut-out Cock, complete.

No.	DETAILS.
8.	Cock Body.
9.	Cock Key.
10.	Cock Cap.
11.	Cock Spring.
12.	Cock Handle.

FIG. 8.

One and One-quarter inch Coupling Hook.

FIG. 9.

No. 1. One and One-quarter inch Drain Cup, complete.

No.	DETAILS.
2.	Cup Body.
3.	Union Swivel.
4.	Union Nut.
5.	Gasket.
6.	Strainer.

FIG. 10.

Release Valve, complete.

No.	DETAILS.
23.	Release-valve Cylinder.
24.	Release-valve Stem.
25.	Release Valve.
26.	Release-valve Spring.
27.	Release-valve Handle.
28.	Release-valve Pin.

FIG. 11.

Pressure Retaining Valve, complete.

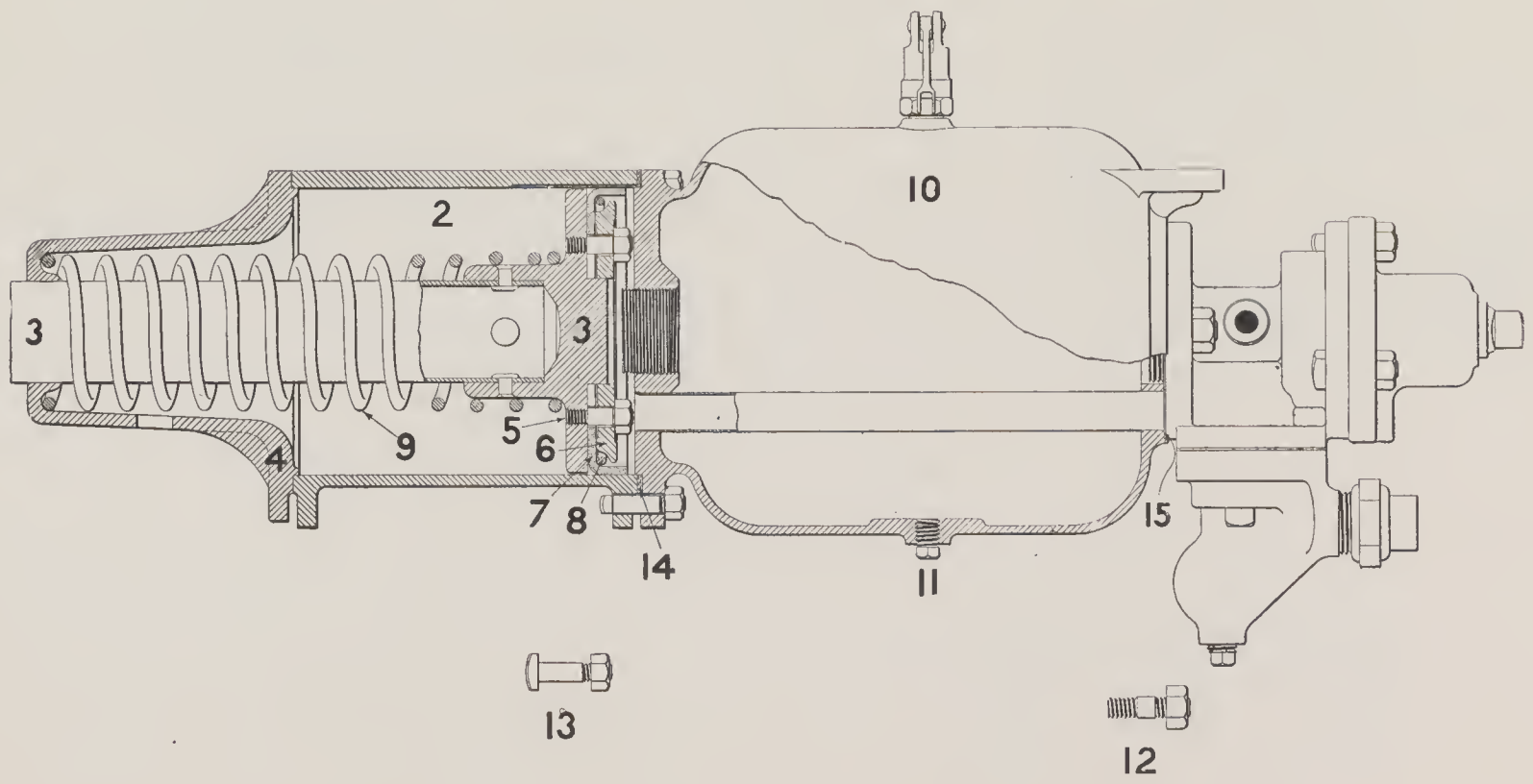
No.	DETAILS.
18.	Retaining-valve Body.
19.	Retaining-valve Cap.
20.	Weight and Valve.

Orders must give number of Plate and of piece wanted.

"SPECIAL" FREIGHT CYLINDER, RESERVOIR AND TRIPLE VALVE.

(8 in. Diameter; 8 in. Stroke.)

PLATE D34.



All parts numbered in above Plate constitute the "Special" apparatus. Remainder of fixtures for complete Car Equipment are same as for "Standard" Freight Car Brake apparatus, Plate D31 and Plate D33.

"SPECIAL"
FREIGHT CYLINDER, RESERVOIR AND TRIPLE VALVE.

(8 inch Diameter by 8 inch Stroke.)

PLATE D34.

No. 1. "Special" Freight Cylinder, Reservoir and Triple Valve, complete.

DETAILS.

No.		No.	
2.	Cylinder Body.	9.	Release Spring.
3.	Piston and Rod.	10.	Reservoir.
4.	Back Cylinder Head.	11.	Drain Plug.
5.	Follower Stud and Nut.	12.	Reservoir Stud and Nut.
6.	Piston Follower.	13.	Cylinder-head Bolts.
7.	Piston Packing-leather.	14.	Cylinder Gasket.
8.	Packing-leather Expander.	15.	Triple-valve Gasket.

Triple Valve. See Plate D31.

Orders must give number of Plate and of piece wanted.

BRAKE AGREEMENT.

Whereas, THE WESTINGHOUSE AIR BRAKE COMPANY, of the City of Pittsburgh, Pennsylvania, operating under sundry letters patent of the United States, some of which are controlled by the said Company, and others of which are owned by George Westinghouse, Jr., of said city, as patentee, is engaged in making and selling apparatus for operating railway train brakes and train signals by compressed air, which apparatus, as adapted for use on the different parts of a railway train, or as employed on different trains or for different purposes, is for convenience classified as per the following schedules:

LIST OF SCHEDULES AND PRICES.

SCHEDULE A¹. LOCOMOTIVE EQUIPMENT, WITH DRIVER BRAKE CYLINDERS.

$250.00 ~~$275.00.~~

SCHEDULE A¹, (constituting the equipment of a locomative in the automatic system of brake apparatus, and including driver brake cylinders:) one 8 in. Pump, one Main Reservoir, one 10 in. by 24 in. Reservoir, two 8 in. Driving Wheel Brake Cylinders, one 3 in. Triple Valve, one Triple Valve Bracket and Nipple and Drain Cup, one Equalizing Engineer's Brake Valve, one 10 in. by 12 in. Equalizing Reservoir, one Pump Regulator, one Air Gauge, one Sight Feed Lubricator, one $\frac{3}{4}$ in. Steam Cock, one $\frac{1}{4}$ in. Finished Drain Cock, one pair 1 in. Couplings with Hose and Angle Fittings complete, one Coupling Hook for 1 in. Coupling, one 1 in. Drain Cup, two 1 in. Stop Cocks, one 1 in. Reservoir Union, one $\frac{3}{4}$ in. Reservoir Union. Price, ~~$275.00.~~ (Pipe and Pipe Fittings not included.)

$250.00

SCHEDULE B¹. TENDER EQUIPMENT.

$40.00. ~~$60.00.~~

SCHEDULE B¹, (constituting the equipment of a tender in the same system:) one 8 in Brake Cylinder, one 12 in. by 33 in. Reservoir, one 3 in. Triple Valve, one Triple Valve Bracket, one 1 in. Tender Drain Cup, one $\frac{1}{4}$ in. Reservoir Drain Cock, one $1\frac{1}{4}$ in. Angle Cock with one 1 in. Reducer, one pair 1 in. Couplings with Hose complete, one Angle Fitting, one Coupling Hook for 1 in. Coupling. Price, ~~$60.00.~~ (Pipe and Pipe Fittings not included.)

$40.00.

SCHEDULE C¹. PASSENGER CAR EQUIPMENT.

$100.00.

SCHEDULE C¹, (constituting the equipment of a passenger car in the same system:) one 10 in. Brake Cylinder, one 12 in. by 33 in. Reservoir, one pair 1 in. Couplings with Hose complete with Straight Nipple to screw in $1\frac{1}{4}$ in. Cock, two Coupling Hooks for 1 in. Coupling, one $3\frac{1}{2}$ in. Triple Valve, one 1 in. Drain Cup, two $1\frac{1}{4}$ in. Angle Cocks with one 1 in. Reducer, one 1 in. Cut-out Cock, one $\frac{3}{4}$ in. Conductor's Valve, one Reservoir Drain Cock. Price $100.00. (Pipe and Pipe Fittings not included.)

SCHEDULE H¹. FREIGHT CAR EQUIPMENT.

$40.00. ~~$45.00.~~

SCHEDULE H¹, (constituting the equipment of a freight car in the automatic freight brake system:) one Brake Cylinder, not exceeding 8 in. in diameter, with 12 in. stroke, one Auxiliary Reservoir, not exceeding 11 in. by $21\frac{1}{2}$ in., one $3\frac{1}{2}$ in. Triple Valve, one Pressure Retaining Valve, one Car Drain Cup, one pair $1\frac{1}{4}$ in. Couplings with Hose Complete, two Coupling Hooks for $1\frac{1}{4}$ in. Coupling,

PLEASE PASTE THIS IN YOUR 1890 CATALOGUE, PAGE 60.

AMENDMENT TO SCHEDULE B[1]

One 10 inch by 24 inch Reservoir, in place of 12 inch by 33 inch.

NOTE:—The above amendment is necessitated by reason of the general prevailing practice of using INDEPENDENT auxiliary reservoirs for operating tender and driver brakes. It was formerly customary to furnish with Schedule B[1] apparatus, a 12 inch by 33 inch auxiliary reservoir, and air pressure from this was used for operating both tender and driver brakes, necessitating the greater size, but which is too large when used with the tender cylinder alone.

If the light weight of the tender exceeds 36,000 pounds, a ten inch tender cylinder should be used, and orders should so specify, when a 12 inch by 33 inch auxiliary reservoir will be furnished.

THE WESTINGHOUSE AIR BRAKE COMPANY.

PITTSBURGH, PA., *December 1, 1890.*

two $1\frac{1}{4}$ in. Angle Cocks, one $1\frac{1}{4}$ in. Cut-out Cock, one Release valve. Price, ~~$45.00~~ $40.00. (Pipe and Pipe Fittings not included.)

Schedule J. Signal Equipment Locomotive and Tender. $30.00

Schedule J, (being the material necessary to equip a locomotive and tender with the compressed air train signaling apparatus:) one improved Signal Valve, one Reducing Valve, one Signal Whistle, two pairs $\frac{3}{4}$ in. Signal Couplings with Hose and Angle Fittings complete, two $\frac{3}{4}$ in. Stop Cocks, one $\frac{1}{2}$ in. Stop Cock, two Coupling Hooks. Price, $30.00. (Pipe and Pipe Fittings not included.)

Schedule K. Signal Equipment Car. $15.00

Schedule K, (being the material necessary to equip a passenger car with the compressed air train signaling apparatus:) one Car Discharge Valve, one pair $\frac{3}{4}$ in. Couplings with Hose and Angle Fittings complete, two $\frac{3}{4}$ in. Stop Cocks, two Coupling Hooks, one $\frac{1}{2}$ in. Stop Cock. Price, $15,00. (Pipe and Pipe Fittings not included.)

Schedule L. Change Locomotive and Tender to New Automatic. $50.00.

Schedule L, (being the material necessary to change a locomotive and tender from the old form of automatic brake to operate the quick action form:) one Equalizing Engineer's Brake Valve, one 10 in. by 12 in. Reservoir, one Duplex Air Gauge, one 1 in. Cut-out Cock, one 1 in. by $1\frac{1}{4}$ in Hose Nipple, one $1\frac{1}{4}$ in. Angle Cock with 1 in. Reducer, one 1 in. Reservoir Union, one 1 in. Tender Hose Connection, necessary Pipe and Pipe Fittings. (The last three items are not required if engines are already fitted with 1 in. Pipe.) Price, $50.00.

Schedule M. Change Car Old To New Automatic. $45.00

Schedule M, (being the material necessary to change a passenger car from the old form of automatic brake to the quick action form:) one 10 in. Front Cylinder Head, two $\frac{5}{8}$ in. by $4\frac{3}{4}$ in. Tee Head Bolts, one $3\frac{1}{2}$ in. Passenger Triple Valve, one 1 in. Car Drain Cup, one 1 in. Cut-out Cock, two $1\frac{1}{4}$ in. Angle Cocks with Reducers for 1 in. Pipe, two 1 in. by $1\frac{1}{4}$ in. Hose Nipples, one Piston Cross Head for 1 in. Pin and Lever, necessary Pipe and Pipe Fittings. Price, $45.00.

Schedule N. Change Locomotive and Tender Old to New Automatic, with Train Signal. $80.00.

Schedule N, (being the material necessary to change a locomotive and tender from the old form of automatic brake to the quick action form, and also to equip same with train air signaling apparatus). For Brake: one Equalizing Engineer's Brake Valve, one 10 in. by 12 in. Reservoir, one Duplex Air Gauge, one 1 in. Cut-out Cock, one 1 in. by $1\frac{1}{4}$ in. Hose Nipple, one $1\frac{1}{4}$ in. Angle Cock with 1 in. Reducer, one 1 in. Reservoir Union, one 1 in. Tender Hose Connection, necessary Pipe and Pipe Fittings. (The last three items are not required if engines are already fitted with 1 in. Pipe). For signal: one improved Signal Valve, one Reducing Valve, one Signal Whistle, two pairs $\frac{3}{4}$ in. Signal Hose and Couplings with Angle Fittings complete, one $\frac{3}{4}$ in. Stop Cock, one $\frac{1}{2}$ in. Stop Cock, two Coupling Hooks, necessary Pipe and Pipe Fittings. Price, $80.00

SCHEDULE O. CHANGE CAR OLD TO NEW AUTOMATIC, WITH SIGNAL. $60.00.

SCHEDULE O, (being the material necessary to change a passenger car from the old form of automatic brake to the quick action form, and also to equip same with train air signaling apparatus). For brake: one 10 in. Front Cylinder Head, two $\frac{5}{8}$ in. by $4\frac{3}{4}$ in. Tee Head Bolts, one $3\frac{1}{2}$ in. Passenger Triple Valve, one 1 in. Car Drain Cup, one 1 in. Cut-out Cock, two $1\frac{1}{4}$ in. Angle Cocks with Reducers for 1 in. Pipe, two 1 in. by $1\frac{1}{4}$ in. Hose Nipples, one Piston Cross Head for 1 in. Pin and Lever, necessary Pipe and Pipe Fittings. For signal: one Car Discharge Valve, one pair $\frac{3}{4}$ in. Signal Hose and Couplings with Angle Fittings complete, two Coupling Hooks, one $\frac{1}{2}$ in. Stop Cock, necessary Pipe and Pipe Fittings. Price, $60.00.

SCHEDULE P. SPECIAL PASSENGER CAR EQUIPMENT. $120.00

SCHEDULE P, (constituting a special equipment for a passenger car in the automatic system for operating brakes upon all wheels of six-wheeled truck cars:) one 14 in. Brake Cylinder, one 16 in. by 33 in. Auxiliary Reservoir, one pair 1 in. Couplings with Hose complete, with Straight Nipple to screw in $1\frac{1}{4}$ in. Cock, two Coupling Hooks for 1 in. Coupling, one $3\frac{1}{2}$ in. Special Triple Valve, one 1 in. Drain Cup, two $1\frac{1}{4}$ in. Angle Cocks with 1 in. Reducer, one 1 in. Cut-out Cock, one $\frac{3}{4}$ in. Conductor's Valve, one Reservoir Drain Cock. Price, $120.00. (Pipe and Pipe Fittings not included.

SCHEDULE X^1. CHANGE CAR NON-AUTOMATIC TO AUTOMATIC. $80.00.

SCHEDULE X^1, (being the apparatus required to change a passenger car from the non-automatic to the present quick action automatic system:) one 10 in. Front Cylinder Head, two $\frac{5}{8}$ in. by $4\frac{3}{4}$ in. Bolts and Nuts, one 12 in. by 33 in. Reservoir, one $3\frac{1}{2}$ in. Triple Valve, one pair 1 in. Couplings with Hose complete with Nipple for $1\frac{1}{4}$ in. Cock, two 1 in. Coupling Hooks, one 1 in. Drain Cup, two $1\frac{1}{4}$ in. Angle Cocks with 1 in. Reducer, one 1 in. Cut-out Cock, one $\frac{3}{4}$ in. Conductor's Valve, one $\frac{1}{4}$ in. Reservoir Drain Cock. Price, $80,00. (Pipe and Pipe Fittings not included.)

EXCHANGING PUMPS. In making exchange of new for old pumps, a credit of $25.00 will be allowed on the price of the new for each old pump returned to this Company at Pittsburgh.

And Whereas, the..... Company, a Corporation duly organized under the laws of the State of..... and operating what is known as the.....

Now these Presents Witness, That the said THE WESTINGHOUSE AIR BRAKE COMPANY, party of the first part hereto, and the said GEORGE WESTINGHOUSE, JR., party of the second part hereto, and the said..... Company, party of

the third part hereto, for the considerations hereinafter named, have covenanted and agreed, and do hereby covenant and agree, to and with each other as follows, to wit:

AGREEMENT TO SELL AND DELIVER.

FIRST. That the said party of the first part will, within a reasonable time after the proper order or orders therefor are received, sell and deliver well made and in good order and condition, to said party of the third part, such sets and such number of sets of the said apparatus (the articles designated in any one of the foregoing schedules constituting a set) as may be ordered from time to time, at a rate not to exceed, for each schedule set, the prices to such schedules herewith respectively annexed, as follows:

PRICES.

SCHEDULE A[1].—~~Two Hundred and Seventy-five Dollars.~~ $250.00
" B[1].—~~Sixty Dollars.~~ $40.00.
" C[1].—One Hundred Dollars.
" H[1].—~~Forty-five Dollars.~~ $40.00.
" J. —Thirty Dollars.
" K. —Fifteen Dollars.
" L. —Fifty Dollars.
" M. —Forty-five Dollars.
" N. —Eighty Dollars.
" O. —Sixty Dollars.
" P. —One Hundred and Twenty Dollars.
" X[1].—Eighty Dollars.

LICENSE FEE INCLUDED.

which prices are for sets so purchased, and when paid for, inclusive of license fee or royalty for the use thereof, complete and unbroken, on the locomotive, tender or car to which they may be applied; but the license to use shall

LICENSE GOOD ONLY AFTER PAYMENT.

not be complete and effectual to protect the purchaser or other subsequent possessor of such apparatus in the use thereof until the said prices are fully paid. But the said party of the first part hereby reserves the right, exercisable at its own option, and at any and all times, to change the prices of Schedules L, M, N and O, or any of them, and any such change made to any party, from or to schedule prices above named, shall not affect any of the provisions of this agreement.

DELIVERY.

Delivery in all cases to be made at the depot, wharf or other designated place of shipment or consignment in the City of Pittsburgh.

REPAIR GOODS.

SECOND. That the said party of the first part, within like reasonable time, will sell, and in like manner deliver to said party of the third part, such parts or pieces or separate detached portions of the apparatus named in the foregoing schedules as may be required for renewals and ordinary repairs in previously purchased complete sets of the said apparatus, charging therefor a reasonable manufacturer's price for making the same, and without other additional license fees for royalty.

ACCOUNTS TO BE KEPT.

THIRD. That the said party of the third part shall make and keep a correct record, open at all reasonable times to the inspection of said party of the first part, or its duly authorized officer or agent, of all cars, locomotives and tenders owned or leased by it and equipped with air brake apparatus, which record shall contain and show all additions to the said equipment, by new sets applied, or by the purchase or lease of rolling stock already equipped, and from whom purchased or leased, as also the reductions of such equipment by sale or lease of rolling stock already equipped, and to whom sold or leased; but the said party of the third part shall not

APPARATUS BOUGHT NOT TO BE RESOLD, EXCEPT, ETC.

order for the purpose of selling, leasing or otherwise disposing of, to others, any part or parts of sets, nor a whole set, except in connection with the car, tender or locomotive to which it may be applied, nor shall it use any part or parts of sets otherwise than in renewing or repairing the lost, or broken or worn out parts of complete sets previously bought and paid for; nor shall it use the appa-

REPAIR GOODS TO BE USED ONLY FOR REPAIRS.

ratus of Schedule H[1], nor any brake cylinder, auxiliary reservoir or triple valve thereof in the equipment of passenger cars, nor of mail, express or baggage cars, nor of any other cars intended or designed to run regularly in passenger train service or as a part of a passenger train; but the occasional use of a

FREIGHT APPARATUS NOT TO BE USED IN PASSENGER EQUIPMENT OR SERVICE.

freight car equipped with the apparatus of Schedule H[1] in passenger train service, in order to meet a special emergency, will not be considered a violation thereof.

FURTHER IMPROVEMENTS.

FOURTH. That in case the said party of the first part should at any time hereafter become possessed of, own or control any other patent or patents for further improvements in the construction of the devices named in said schedules, which improvements the said party of the third part may be desirous of using, the said party of the first part shall sell and deliver to said party of the third part, in like manner, for like use and subject to like conditions, as aforesaid, on proper orders received, the devices so improved, at a regular manufacturer's price for making the same, without other or additional license fee or royalty, except such as will reasonably remunerate the said party of the first part for actual outlay in the purchase of the patents for said improvements.

PAYMENTS.

FIFTH. That on the delivery as aforesaid of any of the apparatus hereinbefore referred to, the said party of the third part will pay to said party of the first part the price thereof, as fixed or stipulated to be fixed by the foregoing provisions.

TO PRESERVE UNIFORMITY, CERTAIN RIGHTS RESERVED,

SIXTH. The said party of the first part, in order to secure and preserve complete uniformity in all parts of the said apparatus as used on different, though connecting railway lines, hereby expressly reserves to itself a right, exercisable at its own option, to furnish to said party of the third part, ready for use, but free of cost, any or all parts of said apparatus, substantially the same construction as that previously furnished, and differing only in form or dimensions, which apparatus so furnished, the said party of the third part, in furtherance of the same object, shall and does hereby agree thereafter to apply and use, to the exclusion of the like devices for which they may be designed as a substitute; and for the same purpose and also for the purpose of ensuring the

efficient and satisfactory operation of said apparatus, the said party of the first part also reserves the right to make and furnish at a reasonable manufacturer's price, and deliverable in the manner aforesaid, all Engineer's or Equalizing Brake Valves, Pump Regulators, Couplings and Triple Valves, and each and every part thereof with which the said party of the third part may desire to renew or replace the corresponding devices or parts on the same locomotive, tender or car, worn-out, broken or lost.

IF REDUCTION OR CONCESSION BE HEREAFTER MADE TO ONE, IT SHALL BE MADE TO ALL.

SEVENTH. In case the said party of the first part should at any time grant any reduction in price above named, or any right or license to any railway company or corporation to manufacture and sell for railway car brake purposes, any or all of the patented improvements named in said schedules, then the said party of the third part shall be entitled to a like reduction for a like consideration, and a like right and license on like terms, considerations and conditions, but nothing herein contained shall be so construed as to prevent the said party of the third part from making all necessary repairs to the apparatus purchased of the said party of the first part as hereinbefore provided, or any part thereof, except as mentioned in paragraph sixth above.

RIGHT TO MAKE NECESSARY REPAIRS.

GUARANTY AS AGAINST INFRINGEMENT SUITS.

EIGHTH. That the said party of the first part will indemnify and save harmless the said party of the third part from all necessary or proper costs, expenses or damages incurred by reason of any suit or suits against the said party of the third part for any alleged infringement of any other letters patent, which alleged infringement shall consist in the use of the apparatus furnished to said party of the third part under the foregoing provisions, provided that the said party of the first part shall first have written notice of such suit or suits and be allowed the opportunity of defending the same.

BUT WESTINGHOUSE CO. TO BE NOTIFIED AND ALLOWED TO DEFEND.

RIGHT TO RUN ON OTHER LINES.

NINTH. That the said party of the third part shall have the right to run locomotives, tenders or cars fitted up with an air brake or signal apparatus purchased from the said party of the first part as hereinbefore provided, over or on any connecting line of railway, or any railway lines owned, leased or controlled by them, without the payment of other or additional consideration therefor; provided, however, that nothing herein contained shall be construed as authorizing the use of any of the apparatus named in the above schedules, in combination with steam or air brake apparatus not made by or under license from the parties of the first and second parts.

RIGHT TO USE CERTAIN IMPROVED BRAKE GEAR WITHOUT ROYALTY.

TENTH. The said parties of the first and second parts being also the owners of certain patents, and inventions for which patent applications are pending, relating to improved forms of brake gear, such as brake beams, brake shoes, brake hangers, brake levers, etc., some or all of which are believed to be essential for obtaining the best results in braking, further agree, and do hereby license the said party of the third part, for the considerations aforesaid, and herein named, to make and use, in connection with the apparatus supplied by the party of the first part,

such improved brake gear involving the inventions covered by the patents already granted to said parties of the first and second parts, or that may be covered by any other patents that said parties of the first and second parts may hereafter own or control; and will also,

MEN TO SUPERINTENO APPLICATION OF, AND INSPECT APPARATUS.

on application therefor, furnish at its own expense, for a reasonable time, competent men to superintend the application of said brake and signal apparatus to the cars of said party of the third part; to inspect the same from time to time, with reference to keeping it in good condition, and to instruct the engineers in the proper use thereof; provided, however, said party of the third part shall furnish transportation for the men so employed, as well as for the officers and authorized agents of said party of the first part.

PARTY OF THIRD PART TO FURNISH TRANSPORTATION.

APPARATUS TO BE USED ONLY FOR PURPOSE FOR WHICH IT IS SOLD.

ELEVENTH. The apparatus of Schedules L, M, N and O, shall be used only for the purpose of changing the old automatic equipment at present in use on the locomotives, tenders and cars of the party of the third part, to the new or present form of quick action automatic brake, and for adding thereto the compressed air train signaling apparatus of said schedules. All material displaced in changing any car, tender or locomotive equipment from the old automatic (that being the one generally in use in this country prior to January 1st, 1888), to the present or new quick action automatic brake, shall belong to and be the property of said party of the first part, and shall be delivered to it on board cars in Pittsburgh, Pa.

MATERIAL OISPLACFO IN CHANGES TO BE RETURNED TO PITTSBURGH.

THIS AGREEMENT TO SUPERSEDE ALL OTHERS.

TWELFTH. This agreement shall, as regards all matters arising after the date hereof, take the place of and supersede any and all agreements heretofore existing between the parties hereto.

In Witness Whereof, The said parties of the first and third parts have caused their corporate seals to be hereunto affixed, attested by the hands of the Presidents and Secretaries of the said respective corporations, and the said party of the second part has hereunto set his hand and seal, this ..... day of ..... A. D. 189

.....[SEAL.]

.....

President Westinghouse Air Brake Company.

Attest :

.....

Secretary Westinghouse Air Brake Company.

.....

President ..... Company.

Attest :

.....

Secretary ..... Company.

List of Pipe and Pipe Fittings required to apply the Westinghouse Automatic Brake and Train Air Signal to Locomotives and Cars:

For applying the Automatic Brake to a locomotive and tender, including driver brake:

60 ft. 1 in. pipe.
15 " ¾ "
20 " ½ "
8 " ⅜ "
15 " ¼ "
3 Nipples, ½ in. x 2 in.
1 Union, 1 in.
4 Unions, ½ in.
1 Union, ⅜ in.
4 Ells, 1 "
2 " ¾ "
6 " ½ "
2 " ¼ "
1 Tee, 1 in.
1 " ¾ in. x ¾ in. x ½ in.
1 " ¼ in.
2 Unions, ¼ in.

For applying the Quick Action Automatic Brake to a passenger car:

60 ft. 1 in. pipe.
30 " ¾ "
1 Nipple, 1 in. x 2¼ in.
2 Ells, 1 in.
3 " ¾ "
1 Tee, 1 in. x 1 in. x ¾ in.
2 Unions, ¾ in.

For applying the Quick Action Automatic Brake to a freight car:

35 to 40 ft. 1¼ in. pipe, according to length of car.
30 ft. ⅜ in. pipe
1 Nipple, 1 in. x 2¼ in.
1 " ⅜ in.
1 Ell, 1¼ in. x 1 in
1 Ell, 1¼ in.
2 Ells, ⅜ in.
1 Union, ⅜ in.
*8 Bolts, ⅝ in. x 4½ in.

For applying the Compressed Air Train Signal to a locomotive and tender.

50 ft. ¾ in. pipe.
10 " ½ "
10 " ¼ "
2 Nipples, ¾ in. x 3 in.
1 Union, ¾ in.
2 Unions, ¼ in.
1 Ell, ¾ in.
1 " ½ "
3 Ells, ¼ "
1 Tee, ½ in. x ¾ in. x ¾ in.

For applying the Compressed Air Train Signal to a passenger car:

50 ft. ¾ in. pipe.
15 " ½ "
2 Nipples, ¾ in. x 4 in. long.
1 Tee, ¾ in. x ¾ in. x ½ in.
2 Elbows, ½ in.
1 Union, ¾ in.

* These bolts vary in length with thickness of blocks employed for fastening brake apparatus to car framing.

List of Pipe and Pipe Fittings required to change from the old Automatic Brake to the Quick Action form, and to equip with Train Air Signal, on Locomotives and Cars.

For changing from the old Automatic to operate the new Quick Action on a locomotive and tender: (For Schedule L.)

35 ft. 1 in. pipe.
8 " ⅜ "
15 " ¼ "
1 Union ⅜ in.,
2 Ells, ⅜ in.

For changing from the old form of Automatic to the new Quick Action on a passenger car: (For Schedule M.)

60 ft. 1 in. pipe.
1 Nipple, 1 in. x 2¼ in.
1 Union, ¾ in.
2 Ells, 1 in.
1 Ell, ¾ in.
1 Tee, 1 in. x 1 in. x ¾ in.

For changing from the old form of Automatic to operate the new Quick Action, on a locomotive, and apply the Air Signal: (For Schedule N.)

35 ft. 1 in. pipe.
30 ft. ¾ "
8 ft. ½ "
8 ft. ⅜ "
25 ft. ¼ "
1 Union, ¾ in.
1 " ⅜ "
3 Unions, ¼ in.
1 Ell, ¾ in.
1 Ell, ½ in.
2 Ells, ⅜ in.
5 Ells, ¼ in.
1 Tee, ¾ in. x ½ in. x ¼ in.

For changing from the old form of Automatic to the new Quick Action on a passenger car, and apply the Air Signal: (For Schedule O.)

60 ft. 1 in. pipe.
15 ft. ½ "
1 Nipple, 1 in. x 2¼ in.
1 Union, ¾ in.
2 Ells, 1 in.
2 Ells, ¾ in.
2 Ells, ½ in.
1 Tee, 1 in. x 1 in. x ¾ in.
1 Tee, ¾ in. x ¾ in. x ½ in.

ADDENDA.

Referring to paragraph Eleven (11) of Brake Agreement:—

Upon the delivery at Pittsburgh of the old material (excepting such as will be used in changing,) removed from Locomotives and Passenger equipment cars, displaced by the apparatus enumerated in Schedules L, M, N and O, a rebate will be allowed as follows:

Schedule.	Gross Price.	Rebate allowed on delivery to the W. A. B. Co. at Pittsburgh of displaced material.	Net Price.
L	$50.00	$10.00	$40.00 per Engine.
M	45.00	30.00	15.00 " Car.
N	80.00	10.00	70.00 " Engine.
O	60.00	30.00	30.00 " Car.